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ABSTRACT

In response to a growing concern with the quality of health care in this country, this conference met to discuss: (1) the role of junior colleges in training medical technicians, (2) the importance of uniformity in the core curriculum, (3) new occupations and changing job requirements, (4) the need for cooperation and coordination between agencies, and (5) the development of better programs for placement, recruiting, and teacher education. This report includes the 19 papers presented at the 3-day conference. (BH)

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GROSSMONT COLLEGE CONFERENCE ON

BIO-MEDICAL TECHNOLOGY and MANPOWER

March 25, 1970

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INTRODUCTION

A clamor has arisen across this country for a better health program. It has become fashionable to lambast doctors and hospitals for alleged failures to meet national needs of our whole populace. On television suddenly a number of opinion makers demand dramatic solutions for what some term a crisis in health care. One voice, at least, has been heard declaring in effect that health care is too important to trust to doctors--perhaps implying that education is too important to entrust to teachers, business to businessmen, farming to farmers, and labor to workingmen.

However, a great amount of thought and encouraging effort has been applied in recent years toward solution of problems generated by massive population growth, vast increases in demands for personal health care, and inflated costs for technologically sophisticated treatments.

The obvious need, then, is for more direct, immediate action by knowledgeable people in the health care field as well as for continuing study of the problems.

The 1970 Grossmont College Conference on Bio-Medical Technology and Manpower sought not only to define health care development from a systems viewpoint, but to launch limited action on some definable problems of particular interest to community colleges. Doctors, educators, businessmen, professional society executives, and representatives of federal/state agencies contributed a substantial expertise. Their objective was to examine critically and to discuss candidly these deceptively simple problems:

1. The role of the junior college in training technicians for health care teams.

2. Acquisition of workable commonality in core curriculums.

3. Definition of emergent new occupations and job requirements.

4. Development of effective coordination for credits between two-year and four-year schools; of better techniques for job placement and achievement of work-experience standards as course degree or equivalent.

5. Development of practical methods of student recruitment, of standards for education of teachers for health sciences and vocational arts in community colleges, and of better liaison among colleges, medical associations, professional societies, government agencies, and industry.

In these Conference preceedings which follow, much of the work accomplished in three action-packed days of frank discussion is presented. Major benefits, not easily recorded, however, resulted from dozens of personal meetings and small informal conferences. A number of worthwhile activities launched or considered for prompt action as a result of these meetings are noted in the "Review and Preview" section of this book.

Charles M. Hatcher
Conference Manager

A WELCOME AND INVITATION

Grossmont College welcomes you to the 1970 Conference on Bio-Medical Technology and Manpower. We are truly proud to see on campus so many knowledgeable people. I know that your mere presence here guarantees active participation in this conference.

We are in a time that demands more than concern, more than expertise. It is a time for risk, for innovation, and for responsible experiment. Most of us are members of two distinguished but traditionally conservative professions--medicine and education. We have done well on the traditions of the past. But the urgency of vast new health and education problems demands far more of us than our present techniques permit.

We need fresh spirit.

We must have enough confidence in our experience and integrity and the self-reliance to look at the new world in both an imaginative and realistic fashion. From this conference must come the beginnings of logical and creative action and creative responses to the technology which challenges us.

It is a time to throw away the phrase "Somebody oughta do something." It is time to put our education and our medical know-how together, to put our techniques to work.

Robert N. Burnham
President
Grossmont College

CONFERENCE THEME

In 1965, just five years ago, the United States belatedly approved the proposition that health protection and medical care are among the rights of citizenship. The Eighty-Ninth Congress proceeded to pass over two dozen bills aimed in this direction of health. As with civil rights and the postal service, there are obvious hiatuses between health goals and the means of reaching them.

The United States finds itself in an interesting and embarrassing position in its health posture. Technologically we are preeminent, with more computers, organ transplants, and Nobel prizes than any other nation on earth. But in spite of, or perhaps because of, our opulence, the undramatic preventive aspects of medicine are neglected, our education and practice of medicine are fractionated, costs are skyrocketing, and our medical services are describable only as non-system.

The situation has been described by increasingly dramatic words, including "crisis." In any case, we are faced by a national problem. And when a problem becomes one of national scale, it involves all of us. In a democracy, problems of national dimensions are resolved in the political-economic arena, and are considered to be too important to be left to the professionals.

Democracy has been defined as the worst form of government except for all others. In a democracy, we will not arrive at neat all-encompassing solutions, which probably do not exist anyway. Instead, we shall proceed with untidy approximations that may be divergent or competitive.

This conference, the Second Grossmont College Conference on Bio-Medical Technology and Manpower, is designed to deal with an important aspect of the national health problem, that of manpower, at the level of technologic and other assistants to the professional cadres. Its special emphasis is on the role of the junior and community college educational systems in the health industry.

We have posed three major questions to our participants: (1) What are the unmet national needs in bio-medical technologic manpower, now and in the future ; (2) What can we do now in order to respond to the defined need, and (3) where do we go from here?

For our discussions we have invited for a full and open discussion representatives of the medical professions, government agencies, professional societies, industry, and education. As your program indicates, the work is organized along introductory panels at which official or authoritative viewpoints are summarized, and followed by workshops in which the topics are to be discussed in depth or in detail as the participants guide them.

We hope that the spirit of all discussions will be one of enlightened self-interest, the basis of democracy. We hope that the conclusions or views developed by the participants will avoid narrow

parochialism, and yet go beyond impalpable generalizations.

We hope that you will not be reluctant to tackle any relevant aspect of the subject. There appears to be concensus that our education and training of all health personnel, physicians to aids, has been too narrow, too fragmented, and has led to closed-end certifications with predictable obsolescence. What educational processes with greater lateral and vertical mobility should be established? Are such educational processes best grouped in medical centers, such as Schools of Allied Health Professions, or decentralized but systemized from high school, through community colleges, state colleges, universities and post-graduate institutions? How should credit for experience and related courses be transferable to encourage upward mobility? What is the core of bio-medical education, and at what level should practical internships be undertaken? What quality controls and accreditations are necessary?

For what health-protection, medical-care system are we going to recruit students? Is it in the present image of a hospital, or a medical center sciences center? Or is it a regionally decentralized system of preventoria, ambulatoria, convalescent and rehabilitation facilities and home care and extended care units, with headquarters in a center that combines specialized medical treatment, research, and public health?

How do we retain the associates who may well staff independently some of the subunits of the system? Do we need assistants to physicians, or new cadres? Should we promote or resist unionization of health workers? What changes in regulations and licensure are necessary to relate the new patterns to legal requirements?

How do we pay for the system and its personnel? What is the role of the government and of the private sector? What differences in practices between the states and regions require reconciliation? Where is the happy medium between bureaucratic central control and disorganized chaos? How do we reconcile quality with quantity, excellence with egalitarianism?

In the matter of priorities, the authorities of the Department of Health, Education and Welfare divide these into people priorities and program priorities. The people priorities emphasize our needs in better distribution of our health resources, to expectant mothers and children, and to the economically poor who inhabit the city slums, and the underprivileged minorities, racial, geographic or economic.

The program priorities place manpower development in primary position. Dr. Roger Egeberg, in an interview appearing in the February issue of U.S. News and World Report, states that we need 50,000 more physicians, 150,000 more technicians, and 200,000 more nurses. At first glance, these appear to be formidable problems. Yet we have over 200 million people; some 1,000 community colleges across the country, and over 100 schools of medicine. The total number of people mentioned

by Egeberg is considerably less than the men we have in Viet Nam! And among our troops alone, some 30,000 men trained as medical corpsmen will become available per year.

The health and medical problems of this nation, as part of more general problems confronting us, deserve a national plan on a scale commensurate with the needs. The creating of a Health Corps, a recruitment and full support of young men and young women for education and training, and systematic employment of such people within our own country may emerge as a resolution of our Conference to forward to the President of the United States. I urge its careful consideration.

But while we wrestle with these cosmic questions, let us also keep our feet firmly on the ground. What should we, what can we, do now, effectively and with our available resources?

Let us not be a part of the problem; let us be a part of the solution to the problem! And this problem is not another Viet Nam. America--let us change it because we love it!

Michael B. Shimkin, M.D.
Program Chairman

KEYNOTE ADDRESS

I want to present to you an overview of health technology education, particularly as such education concerns the junior colleges as they attempt to meet community and national needs for educating and training personnel in the allied health areas.

If we accept the promise that the nation faces an acute shortage of personnel in the service and supportive fields of health and medical care, then it would seem that careful attention should be given to making the most effective use of the nation's two-year colleges to educate the many who will go into the health and medical services.

The capacity for absorbing larger and larger enrollments is apparently one of the most striking features of the two-year college of higher education. It should be pointed out, too, that in relation to this apparently infinite capacity is a responsiveness to students needs which gives emphasis to a heterogeneous student body, a comprehensive program designed to meet varying needs of all ages of students, a uniquely qualified staff that differs in its preparation and interest from the traditional academic staffs so long recognized as a part of the academic community, and a large number of institutions which apparently have widely differing objectives, goals, organized patterns, and procedural methods. Another characteristic of junior colleges is an absence of preconceived notions of what is or is not collegiate subject matter, or what is not college material.

Junior colleges today are being established at a rate of about one each week, which rate of growth is now expected to continue throughout the 1970's. My own association, the American Association of Junior Colleges, estimates that if all the states were to follow the lead of California, one of the earliest state systems, American junior colleges would have an enrollment of six and a half million students by 1975, entailing an expenditure of some $5 billion during the next ten years. But what would be a greater concern to all of us, such a growth would require some 100,000 junior college teachers in addition to those practicing today. While some states are active in junior college development and would seem to be approaching the California level (Florida, Illinois, New York, New Jersey, Michigan, Pennsylvania), a more realistic forecast is that by 1975, junior colleges will number approximately 1,100, serving about two and a half million students and making education readily available and geographically within commuting distance of most of the nation's population.

If a majority of Americans are to have the benefit of educational experience beyond high school, there might be avenues of opportunity distinct from what might be called conventional college preparation. These avenues have already been paved and opened in many community junior colleges. They are called occupational education programs and are designed to prepare men and women for sophisticated technical and semiprofessional jobs in business, industry, the health fields, government, and social service.

The National Advisory Committee on the Junior College has perhaps best expressed the need and the planning required for these programs:

> It should be clearly understood by those responsible for education at all levels that middle-level job education is a legitimate function of higher education, and that the junior college is an appropriate instrument for this purpose. Until such an understanding is reached, it will be impossible to move forward rapidly and wisely enough in planning for the future.

The Committee goes on to explain that most state and local communities interested in expanding educational opportunities review and study educational patterns in terms of population growth, manpower development, and individual needs and aspirations. Junior colleges have been established in many areas of the country as the result of such conscientious review and study.

Most recently established junior colleges have been planned and organized to include programs of occupational education in their curriculums. Furthermore, the colleges are planned in terms of accessibility to students, flexible admission policies, appropriate counseling programs, and low cost.

Universities and four-year colleges are planning with junior colleges for the preparation of men and women to teach the new technologies, and for research into problems that may face many junior colleges in the future. It is clear now that thousands of teachers will be needed by junior colleges in the coming years. It seems evident also that these teachers will require special preparation and attention if they are to take on the responsibility of teaching a heterogeneous junior college population.

Throughout the country, junior colleges are accepting the challenge to establish technical and semiprofessional programs and to expand them commensurate with manpower requirements. Leadership is being provided by the institutions which have the greatest role to play in the national endeavor.

In short, there has been evidence or increasing awareness on the part of society in general of the importance of providing appropriate educational experiences beyond the high school--appropriate to the needs of the individuals and to those who will employ them. Yet, the vast potential of the community junior college in the field of technical and semiprofessional is not yet realized fully. The low prestige value or lack of acceptance of technical education is a major problem. In this country and in many countries abroad the university with its baccalaureate programs is the desired educational objective of many young people, some of whom would profit more and benefit society more from a different kind of program. Occupational programs are chosen often reluctantly as second best options--when, for some, they should be first.

Much could be said to you today about developing occupational education programs in the business related fields, science and engineering,

What are some of the new programs developing in the medical and health fields? For a definitive answer to this question, we should, with footnotes, cross-references, and much detailed description, divide our areas into the professional, the semi-professional or technical, and the assistant, aide, or vocational level of the programs. Unfortunately, so much is happening, and so much is new enough to lack clear definition and indentification that neatly wrapped packages of explicity cannot be offered. Let me give you an example of what I mean. A few months ago I was invited by the Southern Region Education Board to attend a conference in the mental health areas, SREB had received a grant from federal funds to develop the conference and invite as participants some of the outstanding professional leadership and educational leadership in the South. It was a challenging, productive meeting for the health and medical areas. Who, for instance, is the professional, what does he do? To what degree is he educated? What is his role? A few years ago these were not complex problems. He was the medical doctor with specialization in a given field, the psychiatrist, the graduate psychologist, the graduate social worker, and so on. The role of the professional was rather clearly defined. But as the SREB conference began to raise questions, in the light of present day developing needs and demands, the role, the function, the responsibility, and the education of the professional was not nearly so clear. The need for support from the paramedicalist emerged stronger; but who was this person, what would he do, how would he relate to the professional, how much responsibility could he exercise, what functions could he perform, what was his level and requirement of education? These same questions are now being asked of whole categories of personnel, and the answers are not easy because none of us can grasp fully a conception of the world in which our students are going to perform these services or the exact needs of the people living in that world.

Most health professions, and I am speaking now mostly of the educational programs necessary to educate and train the personnel at the professional level, are no longer based upon the single level of competence, and the new educational programs emerging at the medical schools and graduate centers indicate this. The physician, the doctor, for this new age, through the medium of hospital and laboratory, mobilizes a wide group of competencies which supplement and extend his own, and he must be able to organize, administer, and supervise these competencies and the personnel representing them as well as perform highly specialized medical functions himself. The education institute must take note of the education for these and other competencies and articulate them with those of the physician. The need for the professional level program is obvious and desperate but more and more the role of the supportive person must be defined in relationship to the professional level more strongly than it is now in administration of services and the personnel to perform them, in decision and overall policy making that will provide sound

and effective structures for the performances of health and medical services by others, in teaching and instruction, in research and study. The professionally educated person with the baccalaureate, master's or doctor's degree must be the one to break the barriers of medical sciences, tear down the enveloping curtains of ignorance, open the doors to new techniques, new procedures, new devices and concepts, so that the supportive personnel may follow and exercise the functions that have been defined.

However, let no misunderstanding come into our discussion here. There are still those functions of skill, of talent, of educated genius that must be performed. It is still the surgeon who must wield the scalpel, the diagnostician who detects the slow movement of disease, even though he may translate his skill and talent and know-how to the impersonal impulse of an electronic computer, the internist who prescribes with exactitude, the dentist who gives the right and deft touch to the impacted tooth, and so on. But this personnel, with all their talent and skill and genius, must receive a new kind of education and a new concept of their role and function. Not so much are new programs emerging from the universities, the medical schools, the health education centers, but revised and modified educational programs are found to meet the requirements of a new age.

This is not to say that there are not some entirely new programs on the university level educating and training new personnel for new jobs, but the great majority of new careers and new programs in the health fields are found in the less than baccalaureate degree level institutions. Most of the professional personnel so badly needed in the new age have been identified for a long time. Their functions have changed, their roles are different, their education far more complex and weighty, but their position and place has long been known. The new careers, the new personnel and the new programs for them is in the supportive field to them.

There is a little story, obviously apocryphal, that tells the beginning of paramedical personnel needs in the dental profession. One day, so the story goes, a weary dentist with his one-chair office looked into his crowded waiting room and sighed. Many of his patients were waiting for the less demanding kinds of services that he provided: oral examination, sepsis of healing wounds from previous treatment, X-rays for diagnosis of troubles, cleaning of teeth and oral hygiene--and the dentist said to himself, "I need help. I could teach someone to do these things and prepare my patients for treatment. Now if I only had another chair or two, I could devote myself to the serious professional problems, and I could clear my waiting room faster, and I could handle more patients." Today, of course, this is exactly what is happening. My own dentist has his own office, but it is quite a sizeable establishment. There are four chairs. While he is treating one patient, another is being prepared by a dental assistant, another is getting an oral X-ray from another assistant, and the fourth is experiencing

oral hygiene and teeth cleaning from the dental hygienist. The dentist is doing more, and probably doing it more effectively than ever before. Where did all these helpers, the new paramedical, or if we want to be specific in this case, the new paradental personnel get this training? At the community junior college, most likely, in a well planned two-year program leading to an Associate degree. They are the new breed: the health technician, the paramedic.

Here, then, on this technician level of education is the great new challenge, the new opportunities, the provisions for meeting new needs. Robert Kinsinger has identified about forty health related and paramedical programs which have been defined as appropriate to the education program of a junior college. The U.S. Labor Department has named approximately one hundred programs in the health related fields, but many of these are on the aide or assistant level of work.

What are some of these developing programs on the community junior college level? There are several programs that we like to call our older, more "mature" curriculums, such as the Associate degree nursing program, centering its training and education on the personnel for the registered nurse group. These people are the bedside nurses, and it probably will not be long until most of the bedside, practicing nurses in our clinics, hospitals, and nursing homes will come from this associate degree program. There are about 240 associate degree nursing programs in our nation now, and last year over 200,000 students were enrolled in these programs. More are being added in the junior college field each year, and now even larger numbers are registering in our colleges. Another "mature" program is the dental hygiene curriculum carefully developed by the American Dental Association, and still another, the dental assisting program.

At this time we are hard pressed to report to you with accuracy the number or the current development status of the new programs. The New York Times for June 8th headlines: "School for Aids to Doctors Urged." The news article goes on to say: "the school would train for rehabilitation personnel, nurses, medical laboratory technicians, and optometrists...it could help pioneer new health center education programs. Medical practice in the future is likely to be increasingly dependent on a team composed of doctors and supporting staff. Some of the supporting medical staff are being graduated in the community junior colleges...but programs must be expanded."

The Community College Health Careers Project of the University of the State of New York discusses in a new release community junior college programs in opthalmic dispensing, X-ray technology, operating room technology, medical emergency technology, medical secretaryship, and medical librarians aide. Several of the rapidly growing new junior college programs include unit ward manager for hospitals and medical laboratory technician, which may also include optional specialties such as the cytotechologist or the blood bank technicians.

At this point in our discussion, one stark and somewhat frightening fact should be emphasized. All the new programs in medical and health fields are being developed, planned for, and implemented in the light and from the experience of present practices and needs. Certainly these have offered stimulus and guidance as we have rapidly forged ahead from the era past to the era present. But we know as surely as time is the consuming factor of our lives that the current practice and the present experience will change and move on, and the education now received by our students will itself become outmoded. Thus educational development today is focusing not only on the body of knowledge and skill needed to do the job now, but it is also offering broad backgrounds of basic principles and procedures designed to allow for future educational building and adding to by the student, thus producing we hope, the flexible, forward moving person we need. Let me cite one example that has emerged far enough for an outline to become visible of this forward movement. In several of our community colleges there are programs for prosthetic technicians, personnel needed to plan, make, and fit the artificial limbs, fingers and toes. But we are on the verge of a new expansion of the art and skill of the prosthetic technician. Already experiments are reaching the break-through point for the artificial heart and soon it will be quite possible for us, as our old heart begins to wear out and give trouble to us, simply to replace it with a new one. For the prosthetic technician, a vast new future confronts him. How different the design, manufacture, and functioning of a new heart, kidney or lung from the artificial hand or leg. But the technician must be prepared to move forward into his new world, and the educational process must also be on the move to give him skill and confidence in his new world. This sort of advance will be expected in almost all of the medical and health fields, and the trumpet call for "dare and do" has already been sounded for education.

What are the problems facing us in medical and health education? What are the frustrations bearing down on us? Where do we go from here?

Of all the occupational areas, the medical and health fields right now, are the most dynamic and the most challenging, and perhaps are feeling the pressures for need and demand more acutely than others. The Surgeon General of the United States has expressed the need for mid-manpower health personnel at 10,000 workers each month for the next ten years, or some 1,200,000 in the next decade.

First, the general public, and students and their parents in particular, have expressed very little enthusiasm or exhibited very little interest in these kinds of occupational programs or in these careers as an educational objective. A continuing forceful program to acquaint the public with the worth and importance of

occupational education is necessary. All resources of the college must be used in the never ending campaign. Basic procedures in such an informational program would lead to:

1. Emphasizing the attractiveness of such education;
2. Emphasizing the career opportunities of such programs;
3. Emphasizing the career prestige of the health and medical field;
4. Emphasizing the objectives of the program that place it in the realm of goals to be sought after, and to be coveted;
5. Emphasizing that there is no magic in the baccalaureate degree as such. Worth, importance and career dignity will come as quickly to the competent, the able, the skilled as to the degreed person.

Assuming that strong, forceful programs can be developed to interest students and to make the medical and health careers attractive, what are our sources of students? There are several sources of students for paramedical programs--but all require various degrees of active recruitment. The college that develops a program and then sits back with doors open waiting for students to come in is doomed to disappointment and frustration.

1. Our largest source of students is the high school graduate--but once again, the junior college that depends wholly on high school graduates for its students in health related programs will experience enrollment disappointment. All sources should be explored and, yes, exploited.

2. Current college students who have been misdirected into other programs, or who have entered programs through false counseling or misunderstood objectives, or who, for many reasons, may be frustrated in their college work, may be re-counseled into the paramedical programs.

3. Adults who now wish to or find the need to engage in a career may be motivated into programs.

4. Adults who practiced a health profession years ago, and who now wish to re-enter the profession, may need much refresher work.

5. Adults currently in a health related career who wish to move into another field or upgrade themselves in their present employment may be interested.

However, we emphasize that in order to attract students from any of these categories into the paramedical programs, a dynamic, aggressive well planned program of information, encouragement, and counseling must be undertaken.

Second, at this time our career counseling and guidance programs, both on the high school as well as the college level, are not giving effective positive support to the health and medical educational programs or the possibilities for careers. Frequently we find some frustrations in recruiting students for paramedical programs stemming from attitudes and counseling of high school guidance personnel, and in many cases we have caused these frustrations ourselves. We in education have not developed thorough, acceptable techniques of cooperation and coordination with our high school colleagues, and consequently what is finally done on a frantic expedient kind of basis is ineffective and sometimes even distasteful to the high school counselor. We need to set up continuing working relationships with the high school counseling staffs and faculties, we need to start students to thinking about career choices much earlier than the senior year, we need to devise well-planned and prepared programs of information for students as well as for counselors, not on a "one shot" career or college day procedure, but a continuing program, beginning early in the high school years. There would seem to be no doubt that counseling must become more aggressive and emphasized for career choices to the large and growing group of young people undecided on career choices. We must make a more concerted and more aggressive attempt to dig deeply into the "hard-to-reach" group of young people, who, for socio-economic reasons, believe that continuing or post-high school education is far beyond them or whom society believes do not conform to typical middle class conceptions of the "college student." We need to find the answers to questions such as: What procedures, programs or experiences do we develop to meet the decline of vocational experiences for young people (most young people have no work experiences and therefore have little knowledge of the world of work)? What kind of exposures to vocations should they have? What program in force can we adopt to meet the current parental pressures for professional education without regard to the abilities or interests of their children? How can we combat the widely held belief that machines and technology are replacing all workers, and occupational personnel below the supervisory or "professional" level, and therefore professional education (the baccalaureate degree) is a must for everybody?

A third problem in this particular field of education, although it is also found in others, is the built-in restrictiveness of the programs. Our various levels of education and the institutions representing them do not do much articulation of endeavor and efforts... not too much real talking goes on among them. Let me give you an example: A young person enters the practical nurse education program on the vocational level, and while receiving education there discovers a growing and developing talent and motivation. Means can be found to proceed beyond the practical nurse level. Can this be done now without sacrificing the time and money and learning already a factor? In very few institutions or from very few levels of education, if any. But let us think for just a moment: Why isn't it reasonable that this student be able to go directly into the associate degree nursing program on the junior college level without penalty? Or from the associate degree program to the university baccalaureate degree program? We realize that several curriculum adjustments must be

made, but shouldn't it be possible for this continuation of education to be realized for able and developing students? The ladder of progression in education should be possible. We like to call this the open-ended curriculum and we believe it will aid immeasurably in removing the restrictiveness of educational programs that today frustrates and discourages students from entering occupational programs. Mobility of movement in educational programs should be horizontal as well as vertical, with flexibility and adaptability and underlying principle.

We have talked a long time about many things affecting the education and training of people for the medical and health fields, but we feel the subject is important and the issues involved, challenging and grave. A desperate necessity frames the responsibility that rests upon the shoulders of everyone engaged in counseling, directing, and guiding young people as they go through the door to the tomorrows of their lives. May our knowledge increase, our perceptibility sharpen, our sensitivity to need surround us, our wisdom direct us, so that our efforts with those who depend upon us will be meaningful and worthy.

Kenneth G. Skaggs
American Association of
Junior Colleges

DINNER ADDRESS

It is always a pleasure to greet old friends and make new ones. In an age of specialization, it is good to meet with people representing a variety of intellectual disciplines, because too often we are found talking to ourselves. Now I recognize two very good reasons for doing this. First, we enjoy talking to an intelligent person. Second, we like to hear an intelligent person talk. Still, it gets quite boring after a while. It is no great secret that most of the medical specialties rarely, if ever, touch base with one another. The communications pipelines are available, but there just isn't any will or desire to relate to one's neighbor specialist. But just let a bit of juicy gossip concerning a department head get out of the bag and we realize how truly effective a communications network can be.

The obvious and almost total lack of communications between many different-but-related groups of intellectual and professional disciplines is, of course, well-known. For one thing, the emphasis is on the differences rather than the relatedness. For another, you are strongly suspect if you even bother, from sheer intellectual curiosity, to find out what goes on in a so-called "alien" discipline. Interdisciplinary research and development is entered with extreme caution. The feeling seems to be that no one ever steps out of one's birthplace area for legitimate reasons. One only defects. You're a failure. You're a misfit. You're a has-been. You're a non-conformist. Your senators will strongly warn you to guard your disciplinary visibility.

Despite all these dire warnings, fears, and epithets, the field of bio-engineering, or bio-medical engineering has had a recent birth and phenomenal growth. (Parenthetically, some of us may fear acromegalic development, but that is not our immediate concern.) I remember well the early days when the first doctorate-level programs in this interdisciplinary area were at Hopkins, Pennsylvania, and Rochester. They were real curiosities. Now, of course, recent listings identify perhaps more than 125 educational institutions offering graduate programs in this field although the number of engineers on medical school faculties is still pitifully small. One wonders if any parameters have been identified or if any clear and definable area has been staked out. It isn't easy. Professors Rushmer and Huntsman, in a recent article in the AAAS Science suggest that "the ultimate definition of bio-medical engineering should include effective applications of the concepts, approaches and technologies in the full range of engineering disciplines to the wide scope of problems involving living systems for single cells to human populations."

This is quite an order, because we get into trouble when, in an age of specialization, we claim the world. The mental health field has wrestled with this same problem of reasonable limits to jurisdictions. I will shortly return to the manpower implications of this still fluid situation in bio-medical engineering.

However difficult it may be to put the finger in a precise area of concern, there is no doubt about the sheer genius and near-magic of a number of devices in rendering service to the diagnosis, therapy, and rehabilitation of the sick and disabled. For example, in 1960 heart block was considered in the fatal medical curiosity category. Today, pacemaker implantations number approximately 35,000 cases per year.

I will mention only a few of the technological gadgets and wonders of which I have heard. A television camera so small that it can be dropped down the throat to study ulcers; a heart examination table that eliminates all foreign vibrations by suspending the patient on a sheet of air; a little measuring device so sensitive that it can record an impact one thousandth the intensity of the crash of a grain of table salt dropped from the dizzy height of one centimeter, or about a third of an inch; a "look Ma no hands" wheelchair that can be operated by a special pair of glasses worn by the occupant--these fascinate me. But these developments raise the question of direct patient utility versus research utility.

Now we have identified a number of contributory disciplines hitherto not considered relevant--bio-mechanics, bio-materials, and bio-energetics, as well as more obvious ones like automation, computer technology, and validation and testing techniques.

We have identified the specific medical areas of concern--ultrasonics, cinefluorography, thermography, microsurgery, hyperbaric oxygenation, cryosurgery, hypothermia and the various devices such as cardiac pacemakers, artificial heart, lung, and kidney machines, and others. No doubt about it, the manufacturers are busy. Physicians are confronted with an estimated 5,000 types of devices produced by more than 1,300 firms. Another estimate reaches as high as 100,000 different devices produced by more than 3,000 manufacturers. It is believed that the business volume for all types of medical devices is almost $4 billion a year, with about half of this volume accounted for by physicians, dentists and other health professionals.

We are beginning to organize. In addition to such established groups as the American Society for Testing Materials and the American Society for Quality Control, we have recently established the American Society for Artificial Internal Organs and the Association for the Advancement of Medical Instrumentation. And only this year an umbrella group was formed, the Alliance for Engineering in Medicine and Biology. The interesting diversity of institutional membership includes the American Academy of Orthopaedic Surgeons, American Society for Engineering Education, and the American Institute of Biological Sciences. At this very moment, the fifth annual meeting of the Association for the Advancement of Medical Instrumentation is underway in Boston, and its theme is "Automated Patient Care."

Now, we obviously have a tiger by the tail, especially if we match up this phenomenally growing field with the fact that the 3,500,000 to 4,000,000 employed in the health industry constitute the third largest occupational grouping in the country and about to become the second largest.

In zeroing in on a new breed of cat to handle equipment problems--need, use, operation, maintenance--and in considering how many people we need and how much of what kind of training these people should have, some questions must be asked and answered. Who is handling such equipment now? What categories of existing health specialists could have their job descriptions modified to encompass some of the newer functions, duties, responsibilities, and skills? If they can't be so modified, why? We ought to have the answers right down to the nuts and bolts, because in an age of specialization it seems much easier to create a new category than modify an existing one, and this is a real trap.

I am assuming that some careful study has at least identified the job duties and skills of the bio-medical equipment technician, for example. To whom does this person relate on the job--the nurse anesthetist? The radiologic technician? The inhalation therapist? The cardiopulmonary technologist? The EEG and EKG technician? Have detailed task analyses of these specialists been made? Could the new character's job elements be apportioned among these existing people? How would the existence of the new specialist diminish or otherwise modify the job descriptions of the existing groups?

I ask these questions for three reasons. First, I am aware of the fact that too many people are mis-educated. Note, I did not say "over-educated." The gap between academia and the world of work remains wide, so wide that so much knowledge or talent represented by the credential is unused on the job that it creates considerable unrest and job dissatisfaction and turnover. I am not at all averse to expanding and fattening many existing job descriptions in order to give the encumbent a real strong sense of responsibility and satisfaction in meaningful work done well.

Second, in a related manner, no one ever gets <u>trained</u> for a <u>job</u>. He is now <u>educated</u> for a <u>career</u>. Unfortunately, the words education and competence are not synonymous. And because no one knows what the most judicious "mix" is of general and technical education and training--in <u>any</u> field-- we wind up with a person who is neither well educated nor fully competent on the job, one result of which is the scramble for graduate-level training and a credential worth more money, of course, but representing a level of training not required in the first place to perform competently. Therefore, when we create a new specialist, we must be fully aware of the implications and ramifications of our creation.

Third, and particularly relevant to the field of concern for us, it is my strong feeling, always subject to correction of course, that bio-engineering has yet to stake out a clearly defined area. The boundaries are still nebulous and vague. Put simply, the field requires more maturity. This still fluid situation and these yet uncharted waters mean that job descriptions and competency levels are still incomplete and may and do suffer from overlap and duplications of function, duty, responsibility, and skill. Yet the educational establishment has jumped in and created its own occupational hierarchy. We started with doctoral programs. About four years ago, the University of California at Berkeley began an undergraduate program in bio-medical engineering. Many hospitals have been creating their own equipment aides.

Now the community colleges are in the act. My concern is the possibility that the world of work may not actually need a competency level to automatically match each rung in the educational ladder.

I could add a fourth concern, and it relates to the nature of the animal. You know what happens when a new specialty is created. It forms a national organization. It soon engages in jurisdictional disputes with related specialties. It sets up its own wage scale. It creates an idiosyncratic technical jargon. It establishes a quarterly newsletter that soon becomes a professional journal in which simple and straightforward ideas are reduced to their most complicated proportions, all under the guise of contributions to research in the area.

Of course, the world changes. There are people alive today who drove the horse and wagon and who also watched men landing on the moon. The overall length of the Jumbo Jet 747 is greater than the entire distance the Wright Brothers flew off the ground. New research knowledge, new technological devices, new methodologies and techniques all add steadily to the sophistication and complexity of medical and health care and service. We will undoubtedly require new categories of specialists differently trained. My warnings and questions add up to trying to be certain that we are truly involved in legitimate specialization rather than unwarranted fragmentation; that we peg the level of education and training to match the requirements of the job; and that we give as much legitimacy to the credential as possible.

This last observation leads me to describe the educational terrain over which most of you will do considerable travelling. The two most conservative professional fields I know are medicine and education. And they both are in trouble these days. I want to bring to your attention certain limitations or shortcomings in both fields, on the assumption that forewarned is forearmed.

To begin with, what is wrong among the health practitioners and the way they work? First, there is little discussion and elaboration of the "health team" concept anywhere in the professional literature. As a result, the physician continues to delegate duties rather than share responsibilities. More than semantic gymnastics is involved in the distinctions to be made, but there is little meaningful discussion of them. Reference to various state medical licensing laws making the physician solely responsible for the welfare of the patient is insufficient defense. Until the health team concept is clarified, or at least analyzed in terms of what any relevant occupational group thinks about it, the nature and the scope of allied health manpower will remain out of focus.

Second, one of the major prerequisites of the very legitimate manpower cry to "focus on the patient" is the willingness and ability of each medical specialty to throw off its inhibitions and park its professional baggage in order to: (a) determine what functions, duties, responsibilities, and skills are required to deliver optimum patient care and service; (b) re-examine its own activities by using this inventory as a checklist to determine how much of which functions, duties, responsibilities, and skills it is actually delivering to the patient,

and by whom, and at what levels of competency; (c) note what has "fallen between the chairs," and (d) answer the question--What can be done about it?

This is another way of suggesting the maximum utilization of scarce professional talent by re-assigning and shifting certain elements of the physician's job description to less intensively trained or other relegated categories of specialist. Individuals continue to be trained to inadequate or irrelevant job descriptions constructed by the usual illogical and even irrational procedures. We all know them. "It's always been done by this category of specialist." Or a genuinely innovative practice of a hospital administrator ripples across the country by adoption rather than adaptation and becomes totally distorted in the process. Or some poor soul walks by the open door of the medical director and is assigned a task, which after two or three years becomes part of the job description. Or a national organization takes a few pennies from its hard-pressed treasury; appoints a committee of elder statesmen each of whom has long since passed productive working prime; asks them to deliberate for three days each in New York, Miami Beach, Las Vegas, and San Fransisco (Honolulu has been added lately); and at the business meeting of the annual convention three years hence, attended only by the hard-core organizational faithful, The Report is read Walter Winchell style through a public address system which is not quite in working order--and that is how job desciptions are born!

Job analysis has had a long-honored place among the administrative managerial, and personnel practices of business and industry. It is time for its introduction and widespread use in the health field. Call it job analysis, systems analysis--call it by whatever name, but the patient will be appropriately served only by some relatively cold-blooded, detached, and objective procedure for determining what is needed to get the job done, and not by tradition, or organizational fiat, or jurisdictional compromise.

Third, jurisdictional disputes persist within the medical profession as they do in other occupations. The psychiatrist and clinical psychologist would both like to develop an assistant category. So would the opthalmologist and optometrist. And so would the orthopedist and the podiatrist. Yet these groups just don't see eye to eye, to put it mildly. The cooperative and joint rather than unilateral development of assistant categories provides economy of training, occupational and geographic mobility, and interchangeability of services.

Fourth, the career ladder concept or job advancement opportunities within and between health occupations have yet to be developed. The economically disadvantaged have had two- and three-generation-long experiences with dead-end jobs and won't touch them. Middle-class job holders are too restless to "stay put," especially if they possess modest talent and are appropriately motivated. It cannot be denied that many health careers do have career ladders. But there is no occupational mobility, either horizontal or vertical, between the various competency levels. The incumbent's feet are in concrete. Too

many national professional associations are countenancing the establishment of junior college intermediate-level training programs and are then turning their backs by refusing to assign any significant amount of advanced standing to make further progress worthwhile.

Fifth, the annual avalanche of health occupations recruitment literature remains relatively ineffective in proportion to the time, effort, and funds expended for it. One occupation's recruitment brochure characterized its workers as those who occasionally serve under tense conditions and with tight deadlines, and who like precision work and like working with instruments. Well, this is also a classic description of a safecracker! Youngsters want something more that the idealistic pitch often presented. A few modest content analyses might prove helpful. Also, different approaches and appeals might be needed for the economically disadvantaged, minority groups, the retired, the technologically obsolesced, and others.

Sixth, the logic, economy, and related values of the core course and the core curriculum continue more as pious declarations of intent than a conviction and fact of operational curricular life. In times of limited physical plant and scarce teaching talent, it is criminal to come upon as many as four or five variations of the anatomy course, for example, on the same campus: in the medical school, in the graduate school of arts and sciences, in the bio-engineering department, in radiologic technology, in physical therapy, etc. In one health occupation, a survey of instruction in some 55-60 accredited schools disclosed that almost two thirds of all instruction of anatomy was <u>exclusively</u> for those enrolled in that particular occupation.

Seventh, the medical profession must come to grips with the distinctions to be made between legitimate specialization and unwarranted fragmentation, a point to which I alluded a while back. One medical specialty has unwittingly and with the best intentions been party to the development of at least ten specialties at the baccalaureate and sub-baccalaureate levels within the last 15 years.

Eighth, the increasing trend away from the totally hospital-based apprentice type training to a combination of education and training with anchor in educational institutions represents recognition of the need to eliminate the costs of as much of such activity as possible from patient bills. It also represents recognition of the need for more sophisticated level and amount of knowledge possessed by all health personnel, knowledge which cannot be acquired solely from on-the-job, skill-focused exposures. At the same time, many staff physicians, legitimately pressed for extra hands to get on with their work, are loathe to give up handy and cheap labor. Also, many physicians seem unwilling to share training responsibilities with educational institutions.

<u>A good look at educators discloses many shortcomings within the educational establishment</u>. First, the gap between academia and the world of work remains wide. Our culture is certificate-happy. The student "has it made" who is born with a good memory, and who has a mastery of the mother tongue sufficient to indulge in semantic gymnastics at examination time. The educational institution, like a

computer, spills out an endless number of bits and pieces of information. For storing enough of these in the "memory bank," the student acquires so many credits. Specified amounts of credits are exchanged for "a piece of paper." The acquisition of the right number and kind of "pieces of paper" automatically endow their possessor with competence, intelligence, authority, and responsibility. In too many cases, the relationship between the pieces of paper and competence on the job is questionable. Unfortunately, we need the piece of paper more to get the job than to do the job.

Second, as an outgrowth of this state of affairs, the drive for "professional" status has distorted the educational enterprise as well as many parts of the world of work. The urge for academic acceptability, respectability, and visibility represents maneuvers in the lower end of the occupational structure for more desirable pay scales, among other reasons. When a teacher-training institution examines the work of school janitors in a nearby community and then announces a graduate program in custodial science, it is engaging in no more or less questionable an exercise than many medical centers and professional societies that imperiously announce another set of degree requirements for a new specialty and thereby give professional acceptability precedence over reasonable requirements for job competence.

Third, it is indeed unfortunate that formal schooling is still too often regarded as the end of learning rather than the beginning; hence the difficulties in selling programs of continuing education, for example. It may well be the end of study, but it ought to be the beginning of learning. Perhaps this results from our continuing crude and primitive notions of the mystery of the teaching-learning process.

Fourth, health practitioners and professional educators have yet to get together to develop even crude criteria or guidelines by which educational equivalency values can be offered for specified kinds and amounts of job experiences. This constitutes a major roadblock to occupational mobility and stifles incentive. This remains a major difficulty in bridging the gulf between education and the world of work. The sacrosanct agreement among educational institutions, professional societies, regulatory mechanisms, and employers to equate job eligibility almost exclusively with educational achievement is obviously and grossly unfair. Surely, there must be ways, in addition, to formal education and the acquisition of a piece of paper to prove the value and competence of a person on the job.

Fifth, education is education and work is work, and never the twain shall meet. There are still no significant number of work-study or cooperative education programs either in the secondary schools or collegiate institutions, despite their relevance to students' notions and appraisals of the working world. In this regard, the Scandinavian countries are far ahead of us, insofar as occupational exposures (not specific specialty skills) are an integral part of their secondary educational programs.

Sixth, great reluctance persists and there is a widespread inability and unwillingness to develop the potential of and apply some of the newer educational technologies such as programmed instruction and closed circuit television.

Seventh, with more aggressive recruitment campaigns and, hopefully more effective counseling procedures, it is essential that more teachers be developed to handle the increasing numbers of students who will become interested in the health occupations. The ranks of practitioners will have to be raided. The welcome given to competent practitioners brought into the educational world as teachers is considerably less than cordial. Great store is set by teacher-training mystique as currently applied.

This is enough for the present. Much more could be said. The "bill of complaints" is far from complete and is representative rather than exhaustive. I have said nothing about such regulatory activities as accreditation, certification, registration, and licensing. For example, many of the state licensing laws for one of the major health occupations originated in 1915. I have said nothing about the visibility and potential of the new careers movement. I have said nothing about the need for cost-benefit and cost-effectiveness studies in the health occupations. They are non-existent. The frustration in answering the question "What is a baby worth?" can be matched by the question "What is good health worth?" Inability to answer the question must not deter attempts at answers. The overwhelming emphasis has been on patient care, and we are just getting around to preventive medicine and environmental health. What is wrong with the idea of staying well as against getting well? Has anyone disproven that notion that an ounce of prevention is worth a pound of cure?

I have bothered to rattle some skeletons to alert you to the problems and pitfalls of which you must become aware after you have clarified within the field of bio-medical engineering who you need, what these people will do, and how they will be trained.

I can vouch for the fact that most, if not all of the problems I have identified <u>are surmountable</u>. But success must have full and honest cooperation. The sponsors of this gathering are all vital to the success of your efforts--the junior college association, the medical profession, and the engineers. One strategic group is missing--the baccalaureate-level educational institutions. Someone has to care about educational mobility and advanced standing. Someone has to care about the rigor and vigor of course offerings. The intimate and collaborative working relationships between secondary schools, junior-community colleges, and senior educational institutions, especially in comprehensive curriculum construction, are absolutely essential for educational and professional success.

If any of my comments have appeared caustic, snide, or overly drawn, the impression may have been deliberate because too many educational and medical habits and points of view and procedures have become enshrined as near-universal truths just because they have persisted. Periodically they must be challenged and re-examined, and very

often the best time to re-assess and take stock is when a new specialty is in the offing. I hope that I have made some modest contribution to your thinking about these problems.

Israel Light, Dean
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PRESENTATIONS

ALLIED HEALTH PROGRAMS IN CALIFORNIA

Introduction

Grossmont College is to be congratulated on its initiative to hold this national conference which is related to the frontiers of medical practice, i.e., bio-medical engineering. We must have personnel to carry out the functions which these innovations in technology have brought before us. Grossmont is providing us with the platform to deal with this important subject of educating the appropriate kinds of personnel to do the jobs now in existence and the jobs which will be developing at an increasing rate.

My assigned function here is to describe the California scene, where we presently stand in health manpower, and where we are going. To set the background, a brief description must be made of the Health Manpower Council.

The Health Manpower Council

The Health Manpower Council of California is a separate, non-profit agency made up of agencies and organizations which have responsibility for manpower in the state. It includes both private and governmental agencies. Members include:

Professional Groups-such as the California Medical Association, the California Nurses' Association, the Dental Societies, and many others.

Employer Groups-such as the California Hospital Association and the California Nursing Homes Association.

State Agencies-Department of Public Health, Department of Education, and the Department of Human Resources Development (formerly the Department of Employment).

These groups were originally brought together under the leadership of the state's Hill-Burton Committee, the Medical Association, and the Hospital Association, to determine ways to meet the state's increasing requirements for health manpower. The early discussions showed the need for a formal mechanism to serve as a clearinghouse for information on the many diverse activities already in existence and to

coordinate the attack on manpower problems. A council of 25 members was formed to provide the organizational structure to work on these problems.

The Council was officially formed in June, 1967. It soon developed and adopted the following four goals.

1. Research and Studies. A real need existed to determine what information existed, what the gaps were in essential information, and what should be done to provide data that would solve our problem. It was agreed that research would be emphasized in the first two years of the Council.

2. Policies and Procedures. Information gathered from research would logically lead to the development of recommended new policies and procedures in California to overcome identified problems.

3. Coordination. Many agencies were found to be engaged in some aspect of the manpower problem. The Council offered the structure to bring diverse groups together to coordinate their attacks on related problems.

4. Counsel. A real service would result from providing counseling services to persons proposing projects in health manpower and those working on specific manpower problems.

We have found a great demand for our services in providing information about health manpower and about specific manpower problems. This demand demonstrates the need to have an agency that collects, evaluates, and disseminates information on health manpower.

Current Status of Health Manpower

What is the current status of health manpower in California? Are we in a state of crisis? When we examine the national studies on health manpower, we find agreement that we are in a crisis, which is becoming worse.

However, we have found that many of the national studies do not accurately depict California. The data did not match with the situations we were finding in this state. Therefore, the Council conducted a survey of employers of health personnel to determine the extent of the shortage. This survey produced surprising results. There was considerable variation in vacancy rates from county to county, with most counties being quite low, less that five per cent. Los Angeles was higher, but still just 5.1 per cent for all hospital employees. Some areas had virtually no vacancies at all. In some counties there were problems, and in some occupations, such as medical record librarians and inhalation therapists, there were shortages.

This study showed that a small percentage of existing jobs were unfilled. The measure we were applying was one of basic economic demand. There are obviously other measures of need which relate more to providing optimal levels of health care to a population. These needs are of a much higher order than the one we measured. Our measure is a realistic measure of employment possibilities and will show shortages in the current market place.

We found the term "need" subject to considerable variation in interpretation, as you undoubtably found, also. Therefore, I think all of us have to be very explicit about our definitions when we talk about manpower need.

Improved Utilization of Personnel

After evaluating the available information on supply and demand for health personnel in California, we concluded that the presently outstanding problem was not one of acute shortages. Moreover, it did not seem possible to alter the supply immediately since there is a considerable time lag between setting up training programs and placing the graduates on the job. Therefore, it was determined that priority for Council attention should be in improving the utilization of presently trained and employed personnel. If the utilization could be improved by even five per cent, the present shortage--as represented by the overall vacancy rate--would be alleviated. We needed a method which was inexpensive, could be applied in many work situations, and one which would make enough sense to employers and employees that they would not actually make changes in their work practices.

Miss Ann Lewis, consultant to the Council, conceived a plan for training health workers to do a modified form of task analysis which would allow a means of improving the use of health personnel. The method was proved to be feasible through two tests of training personnel in hospital departments to analyze the jobs in their departments. Now, Miss Lewis has worked out the training method and materials. We expect to have the materials ready for release in June. We believe that this method, along with other means of improving utilization, will be a useful way of gaining greater effectiveness in the use of health personnel. Also, it is a way of holding the line on the rapidly increasing costs of health care.

This method of tasks analysis also has two other applications which would be of value to educators. First, it shows the kinds of tasks being carried out to deliver health care. Thus the tasks can be combined into meaningful groups to make up new jobs and new occupations. These new occupations--or better definition of present jobs--can be designed to provide for more efficient use of personnel at each level of training. Secondly, the task analysis not only shows what is being done, and what knowledge is required to carry out the task, but it also shows why the task is being done. This information is of tremendous value to educators who are building a curriculum. It has already

been used in the development of the curriculum for the orthopedic assistant in San Francisco.

California Problems

Although we are working on outstanding problems of health manpower, there are many more which need attention.

Migration is one problem we must be aware of and monitor to detect changes which would alter our balance of supply and demand. Much of California'a health personnel migrates into the state. Over 75 per cent of our new R.N.'s, for example, receive their training in other states. This in-migration has been of considerable assistance to California--at the expense of other states. If the in-migration slows, California will have to find other ways to meet its manpower needs.

Loss of trained personnel is another problem. The health field suffers from persons dropping out of health employment and from high job turnover. Part of this is due to the predominance of female workers in the health field, and females have lower employment rates than males, particularly during child-rearing age. Another problem has been low salaries and dead-end jobs. Considerable improvement has been made in salaries in just the past four years. We have a large group of trained health personnel who are not working in the field of their training. Our manpower efficiency could be greatly improved if we could hold those people who are trained in health work, and bring back into active status those who are not now active in health jobs. Thus, the job is not just to train more people, but to retain more people who receive training.

Another problem is the maldistribution of personnel. There are many geographic areas which have difficulty attracting and holding health workers. This problem even exists in cities which have a large total supply of health workers. Often, health services are not readily available in the neighborhoods which most need health care.

Recommendations

After examining the existing information on health manpower, I would present the following recommendations to help resolve outstanding manpower problems.

1. We require a realistic measure of "need" for health manpower. The various definitions and measures now used lead to such confusion that even professionals in the field do not communicate effectively.

2. We need an on-going measure of the job market. We must know what plans are being made for increasing the jobs; that is, the demand for health workers. What plans are there for new facilities, such as hospitals or clinics, which will require personnel? Will new forms of insurance be instituted which increase demand for services?

3. We need good information on the supply of health personnel. What is the capacity of training programs producing new workers? Are they meeting the needs of the job market in quality and quantity?

4. We need health workers who are trained in a basic health "core curriculum" who can move into health specialties. We must avoid unnecessary fragmentation of health work into such super-specialties that there is little opportunity for mobility or adaptation to new technology.

5. We need to be realistic about funds required to train, hire, and retain personnel. We must also be realistic about the cost of losing trained personnel even though much of this cost is "hidden." There are substantial costs involved in setting up educational programs, obtaining facilities and faculty, and obtaining clinical training facilities. These costs are too high for us not to be efficient.

Summary

This presentation has been a brief overview of how we have approached health manpower in California. First, a Health Manpower Council was formed to provide organizational structure. Research and evaluation was done on the extent of the manpower shortage in California. A method has been developed to improve the utilization of health workers. Some major problems are identified, and I have made personal recommendations for resolving some of the outstanding problems.

Our history in health manpower, at least in the past few years, has been to react to crises and to pass laws reacting to specific situations. This Conference provides a mechanism for us to plan for manpower in an objective, logical fashion. Let's devise a plan which is practical and then set forth specific ways in which we can begin to put the plan into practice.

Kenneth L. Briney
Executive Director
Health Manpower Council of
California

PROBLEMS AND PROSPECTS IN HEALTH OCCUPATIONS:

EDUCATION AND TRAINING[1]

From the point of view of the Division of Allied Health Manpower in the Bureau of Health Professions Education and Manpower Training in the National Institutes of Health, our national objectives can be stated very simply--to increase the number of persons in the allied health professions and occupations and to improve the quality of their education and training. The attainment of these simply-stated objectives is a somewhat more difficult matter.

I know that it is dramatic to cite the extent of health manpower shortages and the facts are too frequently belabored. Nevertheless, health manpower needs are so impressive that I would like to at least refer to the most recent data developed by the U.S. Department of Labor simply to provide some background for the problems to be discussed in this conference. The Department of Labor report states that "employment requirements for hospitals, nursing homes, physician's offices, and other establishments in the health industry are expected to increase from 3.7 million to 5.35 million between 1966-1975--an increase of about 45 per cent. In addition to the need for 1.65 million workers to staff new positions, about one million workers will be needed to replace workers who are expected to die, retire, or leave the labor force for other reasons."[2]

Until a few years ago, the approach to the solution of health manpower problems was thought of in terms of the need for training larger numbers of high level professional personnel, particularly physicians. Recent studies, however, stress the enormous and, needless to say, expensive task of building, staffing, and operating new medical schools. Another observation of these studies is that highly trained health professionals were not utilizing their time and effort on a level consistent with their education and training.

The logic has become more and more obvious, and recommendations have proliferated. What is needed is a greater effort to increase the number and improve the quality of education and training of health personnel.

This recommendation was stated by the National Commission of Community Health Services. Their report on health manpower stated:

> The most promising single measure for assuring an adequate supply of health manpower is optimal use of large numbers of allied and auxiliary personnel. Adequate numbers of such workers can permit the efficient use of highly educated and specialized personnel. Many allied health workers have a unique competence in specific segments of health service. With adequate supervision, and effective liaison among related professional and occupational groups, allied health workers in

> different specialties and with varying levels of education and training can make an enormous contribution to enlarging the provision of community health services. Their participation in the health team can enhance the quality of services and implement the principle that health personnel should not normally be used for tasks below the level for which they are prepared.[3]

The recent rapid development of interest in the allied health occupations has given reason for considerable optimism. There are an increasing number of allied health curriculums and more experimentation in four-year colleges, junior colleges, and in secondary and vocational schools. There are a number of professional associations which are approving the concept of technicians or assistants in their professions as one answer to meeting manpower needs. This is virtually developing into a trend.

There are now some studies underway of the legal aspects of practice which will eventually clarify what duties, functions, and responsibilities can be legally carried out by allied health personnel. Specific visibility to the allied health occupations was given in the federal government when the Division of Allied Health Manpower was established in the Bureau of Health Manpower in January, 1967. The division is responsible for administering the Allied Health Professions Personnel Training Act of 1966. This legislation has stimulated allied health professions education through Basic Improvement Grants to eligible junior colleges, colleges, and universities; grants to non-profit institutions, agencies and organizations for the development of new types of health technologists and technicians; and advanced traineeships to schools for students who will become teachers, supervisors, administrators or are pursuing special areas of study in allied health fields.

I have pointed out a few very favorable developments, but there are some real concerns, too. As in any social development that progresses at a rapid pace, issues and problems are bound to emerge. It is the responsibility and mandate of groups such as this to identify these concerns and problems so that they do not become major roadblocks as the field moves ahead. The future of the allied health occupations will be determined largely by the philosophy, principles, and practices which are adopted today and tomorrow. Waiting too long may well develop a series of problems from which we all may find it difficult to extricate ourselves. I would like to point out some relevant issues and needs.

There is a need for educational institutions to develop a balance between generic and specific training. Too often, employers request, if they do not demand, workers who can step in to do specific jobs, and from their point of view you can hardly blame them. They have jobs to be done and they need warm bodies

to do them. A good example of this is the frequently expressed interest of some employers to require health workers to operate a single piece of medical equipment such as that used in kidney dialysis.

The employment of health workers to carry out very specialized tasks tends to lock them into narrow jobs. They may be able to perform well but have no preparation for jobs on the same level or higher levels. These workers have jobs, but not careers. It is very likely that they will eventually become discontented because they no longer have occupational goals. The employer also loses when he does not help these health workers to function according to their highest capability.

Hospitals and other employers of health workers should be urged to seek the health workers with a reasonably broad health background rather than the robot-like workers who are limited to a few tasks. By this I do not mean that allied health workers should all be college graduates. Persons with limited education, even high school drop-outs, should be provided with generic rather than specialized training. This, of course, puts the responsibility on the employer to teach some specific skills while on the job and also make arrangements with junior colleges and colleges to offer short courses and other forms of continuing education.

A good case for generic training is made by the U.S. Department of Labor in a study of scientific and technological developments and their effects upon health manpower.[4] It is pointed out, for example, that patient monitoring systems will change the role of those who need to observe certain patient measurements; many diagnostic laboratory tests now performed chiefly by hand are being carried out by automatic equipment; newer X-ray equipment will enable technicians to work more quickly and more accurately, but will also require more highly trained persons than have been needed up to now; the work of medical record librarians will be largely automated.

Despite the fact that the health service industry depends largely upon what people do for people on a one to one basis, there is much evidence that there will be vast changes in the years ahead. The innovations in health technology that will most affect health manpower in the next ten years are most certainly those now being designed or adapted for use in patient care facilities. They will involve various kinds of manpower changes, including changes in job content and emergence of new jobs, as well as some labor savings. This question can be fairly asked: How relevant is the education for specific tasks that are now performed by the various allied health occupations?

Colleges have been urged to teach the practical--what the world of work needs. But this prodding must be stubbornly resisted in favor of the teaching principles and concepts. A most serious problem facing colleges and unviersities today is that of educating the student in such a way that the knowledge and skills gained in formal education do not become obsolete in a short time. The goals of education therefore should be directed to generic knowledge, fundamental skills, and flexibility and adaptability to learning which meet the needs of rapidly changing science and technology and organization of human services.

The student who is prepared to be fully productive on his first day of work has been done a disservice by the college. I know that this concept is somewhat less applicable to the junior college than to other components of higher education, but I believe that basically it still applies.

Core Courses and Curriculum

With the expanding need for allied health personnel, junior colleges and colleges are adding a curriculum here and a curriculum there. This often results in a disjointed collection of programs which bear little or no relationship to one another. It is a colossal waste and is working against the achievement of desirable objectives.

The fact is that a great number of health occupations share certain background elements. For example, medical terminology, anatomy and physiology, medical ethics, health care organization and administration all are elements included in the preparation of allied health workers. The identification, development, and incorporation of these common denominators in courses could produce a number of salutary effects. Commonly shared basic units of instruction aid in the integration, organization, and administration of related curriculums. The opportunities of students in health occupations to rub elbows, to learn of one another's occupational interest, to share in learning common information and skills may open the eyes of some trainees to interests other than their original choice. This can eliminate the "round peg in the square hole" syndrome which ultimately ends in dissatisfied employees or dropouts from the field.

Another advantage of core courses is that it enhances the concept of the "health team." Through common education and training experiences, the groundwork will have begun for eventual mutual understanding and better cooperation among the allied health workers and professionals when they work together on the job.

The actual construction of specific core courses and the development of their content are more difficult than the identification of relatively obvious areas of commonality because of the requirements of specific occupations, for example, both medical record librarians and physical therapists require knowledge of certain elements of basic anatomy and physiology but the physical therapists require more

detailed knowledge of the extremities and the muscular system. However, this does not alter the fact that both groups can study these subjects together. What is needed then is a breakout of the physical therapists and the medical record librarians for specialized study to meet their specialized professional needs.

In addition to the development of core courses, the development of core curriculums holds even greater potential. Health occupational training could be grouped according to patient-centered, laboratory-centered, equipment-centered, and community-centered clusters. There is no reason why nurses, physical therapists, occupational therapists, and a few other health professionals cannot take several courses in common. If these common courses are taken in the early part of the two-year junior college or four-year college program, students can delay the decision of career choice, but can also move more readily from one speciality to another without having to start from scratch.

Job Equivalency Credit

We know that people learn in many other settings than in the classroom. This holds for workers in health occupations, too. We need to examine whether knowledge acquired non-academically is equivalent to that learned in a formal academic program.

The need for equivalency examinations for the health occupations as for others is based on the premises that students should not be required to repeat work which they have already mastered; the objectives of college course work can be achieved in other than classroom situations; acquisition of knowledge and skills can be measured by examination; and the results of these examinations can be used by colleges to determine whether advanced placement or academic credit should be awarded for the previous learning and experience.

Equivalency examinations have far-reaching implications for the health occupations and for unlocking dead-end careers and establishing new career ladders. Some pilot studies have been conducted in nursing education and programs have been developed to bridge the educational gaps between the three-year diploma schools and the baccalaureate programs.

Encouragingly, there are a few examples in which junior colleges are offering opportunities for advanced placement based on successful completion of examinations. We know too well the conscientious worker who has all the attributes of the accomplished higher level person but is locked into a dead-end. It is a challenge to provide for these people opportunities consistent with their abilities.

Continuing Education

The advancements in science and technology, especially in the health field, has increased the need for mastery of even larger amounts of knowledge and more and more job skills. The result is that it is becoming increasingly difficult for health professionals to master all that is necessary in regular curriculums.

The logical accommodation that should be made is to pattern the curriculums along broad generic lines with the inclusion of specific job knowledge and skills to be included in the latter part of the curriculum. Beyond this then is a need for learning to take place on the job and in programs of continuing education.

Junior colleges and colleges could serve a most valuable function through the provision of continuing education programs which would need to be tailor-made to the needs of hospitals and other health care facilities.

Role of Hospitals in Health Occupations Education

On the part of hospitals and other health care facilities, there are some definite contributions which they can make with regard to allied health education. First, as employers they should clarify their expectations of employee job performance. What is sorely needed is a recognition that it is better in the long run to have an educated technician with some occupational mobility rather than a robot technician stuck in a dead-end job. The agreement of the educated technician with job mobility may well be one of the necessary ingredients that keeps the worker interested and motivated and less likely to be a health worker drop-out which, in the long pull, will reduce the number of people to be prepared to do the needed jobs.

Hospitals and other health facilities are the key to the on-the-job training component which is the necessary complement to the didactic teaching provided in the junior college or college classroom and laboratory. Hospitals must affiliate with the ever growing number of educational institutions which provide the students with the essential ingredients of practical on-the-job supervised learning experiences.

As employers, hospitals and other health facilities should seek opportunities for coordinated programs aimed at improving the quality of performance and upgrading allied health workers. To facilitate this there should be released time for study and credit toward promotions as valid motivations for workers who will improve the quality of services which they can render.

New Careers

A discussion of the allied health or paramedical careers must take note of the development of the new careers movement. The concept of new careers, developed through programs of the U.S. Department of Labor and the Office of Economic Opportunity, supports the position that human service occupations are in need of employees and that among the economically and culturally disadvantaged are a reservoir of unemployed and under-employed persons, many of whom can make significant contributions if provided with the proper training. The position taken espouses the view that the disadvantaged have been educationally neglected and that innovative methods, geared to their special needs, should be instituted. The new careers concept is a partial answer to both problems of unemployment and poverty and to the needs of the health field.

A second principle emphasizes the value of remedial education, particularly in those subjects which help the individual pass an examination to receive a high school graduate equivalency diploma (GED). The new careerist at this point will be on the aide level, but after a specified period, say six months, should be given a wage increase and assigned to an occupation in which he is interested and in which he shows reasonable competence.

Following completion of the GED, the new careerist should be enrolled in a junior college health occupations curriculum. There should be released time from his job. All the while, there should be opportunities for flexibility in his assignments at the hospital or other health facility. The core curriculum at the junior college should offer additional exposures to other occupations, and by the completion of the second year, which may actually take three years if pursued on a part-time basis, the new careerist will have achieved technician status in a specified occupation.

While working as a technician, he should be able to enroll, if he chooses, in the third year of a four-year program in his chosen field, to become a technologist. Upon completion he will have earned a baccalaureate. His attendance at classes will be on released time. If, as a technician, he does not wish to pursue a baccalaureate, he can take continuing programs and in this way qualify for an advancement in status.

The general pattern then is one of career mobility and built-in education and training opportunities to raise the individuals from entry level jobs as technicians and technologists, on to professional status according to the ability of the trainee.

New careers have strong implications for the entire health field. The concept, in order to become an answer to the manpower shortage, must be recognized by all elements in the health complex, including the hospital, educational institutions and surely among all health planning organizations and mechanisms.

I have only touched on some of the major issues in the education of persons in the allied health occupations. Judging by the excellent program planned for this conference, you will hear much more about these and related issues. The outcomes will certainly help all of us as we become increasingly involved in the education, training, and utilization of allied health workers.

Joseph Kadish
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FOOTNOTES

[1]Presented at the Grossmont College Conference of Bio-Medical Technology and Manpower, Grossmont College, El Cajon, California, March 24-26, 1970.

[2]Health Manpower, 1966-1975, Report No. 323, U.S. Department of Labor, page 1.

[3]National Commission on Community Health Service, "Health Manpower to Meet Community Needs," page 22.

[4]"Technology and Manpower in the Health Service Industry 1965-1975," U.S. Department of Labor Manpower Research Bulletin No. 14.

WHAT ARE THE UNMET NEEDS AS THE AMA SEES THEM?

I am grateful to the Program Chairman, Michael B. Shimkin, for this opportunity to discuss the unmet needs in the education of bio-medical technicians and technologists as the American Medical Association sees them. Kenneth Skaggs and Kenneth Briney have pointed out that there is a rapidly increasing use of medical instrumentation--some of it connected to computers--in the practice of medicine. Bio-medical technicians and technologists are working under the supervision of physicians in providing these new services to the patients.

Medical instruments--including computers--are being used by physicians as tools to improve medical care. New medical instruments and computers are providing instantaneous physiological data to speed clinical decision-making; they are being used to take patient histories; they are being used as patient record storage banks and data compilers and retrievers for medical education and research.

Medical instrumentation can have tremendous implications for patients, especially in preventive medicine, the care of the acutely ill, and the chronically ill, in the extension of medicine to ghettos and rural areas, and in education.

Pacemakers, heart valves, new polymers for orthopaedic prostheses and diverse monitors of physiological function are among 5,000 types of devices available to physicians from 1,300 manufacturers mentioned in a summary report of a National Conference on Medical Devices, held in Bethesda last September by the Association for the Advancement of Medical Instrumentation (9650 Rockville Pike, Bethesda, Maryland 20014). Technician support for medical instrumentation was discussed at the third annual meeting of the AAMI in Houston in 1968.[1]

As we meet today in San Diego, another conference is being held on the opposite side of the country; "Automated Patient Care" is the theme of the fifth annual meeting of the Association for the Advancement of Medical Instrumentation in Boston. Several hundred authors are presenting a total of about 175 papers at 24 sessions during the three-day meeting.

Of course the space program includes the most elaborate instrumentation in medical history. In addition to the life support systems for orbiting astronauts and trips to the moon, there is a complex of instrumentation monitoring in the health maintenance program for several dozen astronauts in training. This was referred to in a session of the 1969 annual conference of the Instrument Society of America in Houston.[2]

The key NASA group for this work is the Medical Research and Operations Directorate at the Manned Space Center near Houston. Charles A. Berry and his staff maintain a doctor-patient relationship with the astronauts and work with engineers to make noise and temperature and oxygen levels in the space capsules close enough to optimum.

Infectious diseases which might disable the astronauts receive much attention, and preventive medicine is of major concern in the medical program. This becomes all the more important as NASA looks ahead to one and two-month missions in orbiting workshops.[3]

No less than 478 papers were presented at the 21st Annual Conference on Engineering in Medicine and Biology held in Houston in 1968. I think it is significant to note that when such papers are classified according to the apparent anatomical region of interest, cardiovascular instrumentation is by far the most prominent subject. One reason for this is that 255 bio-medical engineering projects are receiving financial support from the National Institutes of Health.[4]

Arnold W. Pratt, Director of the NIH Division of Computer Research and Technology, has a staff of about 100 mathematicians and engineers developing a system of physicians and allied medical professionals to use the long distance telephone (including, of course, telephones in automobiles) to get audio--voice answerback--information from a computer. Several computers are linked as sources of information for therapy computations (for example, therapeutic computations for burns, with instructions on dosage calculated in regard to the patient's age and weight), drug information diagnostic assistance, literature search, and hospital medical records. All kinds of communications terminals, of which the most ubiquitous is the telephone, can be used by physicians and allied medical workers to make short inquiries for explicit and important immediate medical tasks. Pratt and his assistant, William C. White, call the system "Medinfo."

The increasing use of instrumentation in the $63 billion health industry is big business. IBM is working on a "Clinical Decision Support System" with the assistance of Frederick J. Moore, M.D. at the Advanced Systems Development Division of IBM at Yorktown Heights, New York. A number of other big corporations are busily at work in the field.

One indication of the size of the medical instrumentation industry is a 1966 study of the medical electronics business by Dana L. Thomas, who found $90 million annually in diagnostic equipment, $80 million in therapeutic equipment, $50 million in monitoring devices, and additional millions in data-processing and laboratory equipment.[5] According to Arthur D. Little, Inc., the total market for medical technology including electronic devices, probably exceeds $450 million a year.[6] In 1950 there were about 35 companies engaged in some medical instrumentation activity; now the number of companies has more than doubled.

The American Medical Association Board of Trustees has appointed one of its members, Max Parrott, Chairman of a committee on computers in medicine. Medical instrumentation and the computer are tools which physicians use to sharpen clinical judgement, and which allied health workers can use under physician direction and supervision. Dr. Parrott said: "I can foresee where every doctor, or every group of doctors, might have a terminal where he could get information on a therapy routine, or drug information."[7] Duke University's Department of Community Health Sciences is developing a computer-stored data bank of diagnostic information.

You might wonder whether medical instrumentation is not one subject, and the use of computers a separate subject. The close working relationship is demonstrated by several programs here in California, including the computerized cardio-pulmonary intensive care unit in Presbyterian Hospital of the Pacific Medical Center in San Francisco. There is a collection of instruments and monitoring terminals which measure and display in numeric data a patient's current systolic and diastolic arterial pressures, venous pressure, heart rate, body temperature, and current electrocardiogram. During the year the unit has been operational, the mortality rate from unexplained cardiac arrests in intensive care has been dropping. John Osborn, head of the PMC Institute of Medical Science, is working to eliminate paper-and-pencil nurse notes; nurses will put their clinical observations directly into the computer by push button. The physician uses the instrumentation, including the computer, for an early alarm system. He programs into the computer minimum and maximum limits--discrepancies trigger the alarm system. The range of electronics required by a fully equipped hospital covers a broad spectrum, from patient monitoring to kidney machines and blood analysis--with computers doing the paper work. It is estimated that perhaps as much as a third of the cost of medicine is documentation.

Unmet needs seen by the American Medical Association include those for manpower, more and better medical care in areas where the under-privileged live, and continuing education. The AMA sees the work of bio-medical technicians helping to meet these needs.

Manpower

We act as though we think that all problems in medical care are solved by more manpower. Actually, medical instrumentation and computers can help to solve problems seen as manpower shortages.

One of the major contributions of bio-medical instrumentation is the potential for increasing the productivity of physicians. There are questions as to whether instruments will actually do this. It is possible to increase the demand for more services, thereby making manpower problems more acute. If we use these new tools wisely, we might be able to lessen physician manpower problems.

The proliferation of technical and professional disciplines within the hospital is creating a problem, according to the Council on Professional Services of the American Hospital Association. I agree, and defer to them on the question as to whether there should be a proliferation of occupations concerned with bio-medical instrumentation.

The American Medical Association has a council on health manpower, which has a committee on emerging health manpower which uses the newly adopted AMA guidelines for the development of a new health occupation in determining whether a new allied health occupation is needed.

As the AMA sees it, any institutions or organizations interested in establishing the need for a new allied health occupation should use these criteria to develop national consensus. Only after the Council on Health Manpower has recognized a new allied health occupation is the AMA Council on Medical Education ready to consider what the educational program should be for such allied health people.

The Underprivileged

The AMA is especially concerned with health and medical services for the poor and has a special committee at work to assure effective action to provide more and better medical services to the underprivileged.

Right now, perhaps the most critical, socially oriented area to which medical instrumentation may be addressed is the provision of more quality medical care in ghettos. This is one of the ways medical instrumentation, including the use of computers, can become tools which effectively help to solve manpower shortages in slum areas.

Arnold W. Pratt and his Division of Computer Research and Technology at NIH says the goal is to place a "computer-based information capability at the disposal of the physician, the nurse, the public health workers...but more importantly, the paramedical people who we think can enter the ghetto. We would simply like to get the paramedical personnel out of the hospital, but have the same working environment--diagnostic backup...immediately available on the telephone via answerback by voice.

Dr. Pratt says: "We think you could send nurses or paramedic people into the ghetto and set up shop at a temporary location and use a set of simple diagnostic procedures which may in a sense be pre-screening."[9]

Obviously physicians can direct diagnosis and treatment for more patients in more areas by using medical instrumentation and computers, involving allied medical workers who provide service and use this equipment.

Continuing Education

The continuum of formal education as a life-long need for health professionals is accentuated by medical instrumentation. Technological progress is rapid, and education must continue to keep up.

Furthermore, one fortunate aspect of computerization is the development of the teaching machine, which makes it possible for each of us to learn at our own respective rates and at any hour of the day or night, depending on our own schedules and daily living patterns. Single-purpose audio-visual and multi-media instructional aids in individual student booths, and the computerized teaching machines give us "workbooks" with which we can interact personal learning experiences at times of our own choosing on subjects for which we have felt needs.

Medical instrumentation gives physical embodiment to the need for each of us to continue our formal education. The use and servicing of medical instruments requires a growing number of bio-medical instrument technicians and technologists who must be capable of tutoring other health workers in how to use this equipment, and who must be capable of servicing the instruments.

The initial education of the bio-medical technician must prepare him to operate, maintain, and repair mechanical, electrical, and electronic equipment and instruments which physicians use in medical practice in laboratory and clinical settings.

The curriculum should be broad enough to enable students to develop the necessary competence to monitor patient functions (for example, cardiac functions and nerve functions), assist in diagnosis (electrocardiography, electroencephalography, radiography), assist in therapeutic activities relating to patients' organic functions (cardiac defibrillators, pacemakers), augment body functions during surgery (for example, heart-lung bypass), and support life in acute or chronic systemic failure (pulmonary resuscitation, kidney dialysis).

To be able to do this, the students will need knowledge and understanding of basic principles in physics (including nuclear), chemistry, electronics including new developments in solid state electronics, mechanics, and mathematics through calculus; human anatomy and physiology; bio-chemistry and physical chemistry; computerization; medical engineering terminology; instrumentation systems; graphics; and, to top it all off, interpersonal and group dynamics, with special reference to relationships between hospital departments and medical service agencies.

The student must also develop an array of special skills, including those necessary to operate, maintain, and repair the equipment and instruments used in bio-medical engineering; maintain optimum safety conditions (consider electrical shock hazards, and the fire potentials in the use of oxygen); work within and maintain aseptic environment; analyze gases; and use tools needed in electronics work as well as conventional machine tools.

By the way, if the bio-medical technicians and technologists are really working in the field of engineering--if we are talking about a bio-medical engineering technician and a bio-medical engineer--I think the accreditation of their educational programs would probably be provided most appropriately by the Engineers' Council for Professional Development.[10]

In any event, the education of such technicians could be provided in a number of settings, including the community or junior college. A technical institute, a four-year college, or a university center for health related professions could also be excellent settings for such educational programs.

I would like to conclude with some general philosophic comments on the big picture in which we place bio-medical instruments and the technicians who service them.

We like to say that everything is becoming more specialized, but that is not always true: some areas and subjects are becoming more generalized: When I was in high school and college, chemistry was one subject and physics was another. But studies leading to atomic energy have blended chemistry and physics into one. During recent decades, former distinctions between life sciences and engineering have similarly blurred. Bio-medical engineering has become a chain reaction affecting the economics of the delivery of health care through new diagnostic and therapeutic techniques. Consider how organ transplants and artificial organs pose new problems in medical ethics, law, religion, philosophy, and morality.

By the way, you have probably been hearing and reading about increases in malpractice suits. What can a doctor do? He can be all the more careful to practice the best possible medicine, but the doctors who have taken care of my family already do that, in my opinion.

Another thing the doctor can do is order the fullest possible range of tests so as to be able to give affirmative answers on the witness stand when questioned. This means more use of medical instrumentation. And the doctor can order more malpractice insurance. The patient pays higher costs because of malpractice suits and we deplore this.

Bio-medical engineering is not a narrow, specific subject; it involves the whole range of engineering disciplines to human life, from the single human cell to whole population groups.

The challenge and the opportunity of computerized bio-medical instrumentation is that we can work toward providing the benefits of these developments to more Americans in more locations. To accomplish this, new types of allied health workers must be equipped with new kinds of equipment to increase their effectiveness so that they can relieve physicians of the routine work in diagnosis and treatment, and free physicians to make the decisions which only they can make.

Almost all of the members of the AMA are practicing medicine--not in the large medical centers where transplantation and artificial organs are so highly publicized, but in the areas where the patients live. Kidney transplantations, which cost from $5,000 to $40,000, are dramatic and newsworthy, but they benefit small numbers of patients at enormous cost.

As the AMA sees it, medical instruments and computers are tools which can help physicians and allied health workers to diagnose and treat more patients--including those in the ghettos and rural areas, and the additional education required for physicians and medical instrument technicians will help all concerned to give far more effective attention to health maintenance.

Junior colleges have a major role in this work for more and better medical care for all Americans.

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REFERENCES

[1]Ralph Kuhli, "AMA Interest and Support for Technician Training Programs"; Journal of the Association for the Advancement of Medical Instrumentation; Vol 3, No. 3, pp. 106-109.

[2]Ibid., "Highlights of Allied Health Professional Education"; 69-658; Instrument Society of America (530 William Penn Place, Pittsburg, Penn. 15219).

[3]"Space Program: More Time for Bio-Medical Research?" Science; Vol. 167, No. 3924, pp. 1469-1471.

[4]Robert F. Rushmer and Lee L. Huntsman, "Bio-Medical Engineering"; Science, Vol. 167, pp. 840-844.

[5]Dana L. Thomas, "Space Age Medicine"; Barron's; Dec. 26, 1966.

[6]Harold B. Meyers, "The Medical-Industrial Complex"; Fortune, Vol. LXXXI, No. 1; January 1970.

[7]"The Computer in Medicine"; American Medical News (535 North Dearborn St., Chicago 60610); March 2, 1970.

[8]"Guidelines for the Development of a New Health Occupation"; Council on Health Manpower; American Medical Association (535 North Dearborn St., Chicago 60610).

[9]American Medical News, American Medical Association; March 2, 1970; pp. 8-9.

[10]Engineer's Council for Professional Development, (Sydney B. Ingram, Executive Secretary; 345 East Forty-Seventh Street, New York 10017).

HEALTH MANPOWER: A STRATEGY FOR ACTION

I suspect that there is not one person in this audience who does not know that there is a health manpower shortage. It is beyond me, as I am sure it is for all of you, how one issue--health manpower--could be dramatized for so long by so many, and yet produce so little positive action. Today, I will not dramatize, I will give no figures on the shortage. I will not emotionalize the problem with shocking statistics. In some detail I would like to do three things. First, explore why there is a shortage. Second, postulate who or what is responsible for the shortage. Third, consider what must be done to meet not only projected needs, but present needs as well. As I explore these three issues keep in mind one question: As a conference group and as individuals, what are you going to do about it?

First, the two fundamental issues of why a shortage and who is to blame. The most personally rewarding approach is to find a scapegoat and place the blame on him or it and thereby soothe everyone else's guilt feelings.

But let us admit from the start that it is futile to ascribe any single cause or entity as being instrumental in bringing on the shortage. It is a wide assortment of factors, all so intertwined that it is almost impossible to isolate them.

It appears that the shortage was first generated by the rising expectations of society. As we became more affluent, we learned to demand the best, and more of the best, in the delivery of health services. With our affluence we also became more aware of the various health resources that were available, or being developed, to provide the services we needed. Scientific advances in dealing with problems of mental health, pre- and post-natal care, and chronic diseases made us turn in greater numbers to seek medical assistance. The development of new diagnostic and therapeutic techniques attracted larger numbers of individuals to elaborate hospitals and health centers which were capable of offering these services. The health occupations, in turn, were charged with the responsibility to provide and to offer these services. Health personnel were needed to staff and to operate the vast array of sophisticated techniques and approaches that were being developed. More often than not, this additional staff was recruited from the ranks of existing professionals.

An example of how the ranks of individuals, who were primarily concerned with bedside care, were depleted can be cited. To administer EKG's, monitor the data in intensive care units, staff clinical research centers, and administer laboratory and research facilities often we recruited personnel from the nursing profession. As each new task was created or an additional assignment was made, existing personnel were thrown into the breach. This was an easy recourse, for existing health workers can provide the needed services in a relatively short length of time with minimal training or retraining. Few thought of the serious consequences all this would have on the health manpower supply--our health science progress grew geometrically, but the manpower to make that progress a reality did not keep pace.

While the expectations of our country were continuously rising, the professions failed, in those early days, to become alert to the consequences of these expectations. The health field has gained tremendous stature because the individuals that make up the health occupations have developed as professional groups. The professional groups were able to establish standards that guaranteed the quality of the services rendered. However, rigid, uncompromising professionalism is hardly the environment in which creativeness can develop. Therefore, another factor in the health manpower shortage was the failure of the health professions to become alert to what was transpiring. Admittedly, some groups were pleading for the resources to enlarge their membership, but increasing the number was not the simple answer.

While the professional groups can often justify their lack of foresightedness on the growing crisis, they are hard pressed to find justifiable reasons why they were not improving the quality of health services.

The professional groups should have been alert to what was transpiring about them; more and more was being asked of them, and their numbers were not appreciably increasing to meet their new responsibilities. The professional groups, the groups that were on top of the situation, were in an excellent position to find better ways to deliver health services.

One final observation about the professions and their failures. As groups became well established and achieved professional status, they became closed societies. These closed societies, while they were justifiably guardians of standards, also became rigid in their thinking about the developing health manpower shortage. The only solution that was being offered was that more of the same kind was needed. Physicians wanted more physicians; nurses more nurses; physical therapists suggested more physical therapists, but few innovative suggestions were forthcoming.

If the professional groups had been engaged in critically examining the ways health services were being delivered, they would have perhaps realized that in addition to increasing numbers <u>new</u> approaches to the manpower crisis were needed. They would have realized sooner that new occupational groups were needed and that these should develop <u>de novo</u> and not follow existing ladders. This, of course would have called for some fresh thinking and the abrogation of certain duties and privileges on the part of the groups. Existing professional groups often were, however, reluctant to concede even a small portion of their vested interest, an interest not often the legitimate concern of the profession.

In addition to failing to be innovative in the development of new levels of health personnel--or more often, preventing the innovator from being innovative--the professional groups developed tunnel vision in regard to their own professions. This tunnel vision was compounded by the lack of communication among the professional groups, for each seemed deeply engrossed in its own self-centered problems. The tunnel vision resulted in a series of terminal occupations; once an individual was accepted into the membership, he or she was locked into that membership. The individual who became dissatisfied or disillusioned with one

health career could not move into another health career unless all the rigid requirements of the new one were satisfied. No credit was given for past experience or education. All of the professional groups became rigid in their requirements, and when they met to consider health manpower shortages it represented the myopic leading the presbyopic!

The third factor in the manpower shortage was the failure of institutions educating students for the health professions to rise above the rigidity and complacency of the professional groups. Educational institutions have always been ascribed the responsibility of meeting the health needs of society through the development of educational programs. Professional groups' complacent behavior can be understood, but since educational institutions have always prided themselves on their dynamism and sensitivity to social change, that they did not react more forcibly to the acknowledged health manpower shortage is therefore doubly condemning.

As one looks at the activities of educational institutions during the years the shortage was developing, it is difficult to identify many institutions that assumed leadership. The educational programs, while showing some innovation, were the classic programs. Medical schools produced physicians; nursing schools produced nurses; physical therapy programs produced physical therapists, and so on. Everyone was reluctant to assume a greater responsibility; everyone was concerned with his own particular vested interest. Our energies were dissipated on settling internal conflicts, conflicts which should have never arisen.

I have deliberately avoided pointing an accusing finger at any one educational program because all share equally in the lack of responsiveness to the manpower shortage. I am willing to concede that many of the issues argued by various educational programs obviously had to be resolved, but the point is that an inordinate amount of time was spent staking out boundary lines identifying spheres of influence. The tragedy is that all of this effort could have been more profitably spent with positive, constructive, frontal attacks on the health manpower shortage. What it all boils down to is that educational institutions clearly delineated their goals and were reluctant to waver from them. When the professional groups failed to institute research on the delivery of health services and examine ways in which new levels of health personnel could be trained, the schools should have set the pace for others to follow.

<u>In the final analysis, many educators also turned out to be guardians of vested professional interests</u>.

The hospitals represent the fourth factor in the health manpower shortage. One can afford to be a bit more charitable in the criticism of hospitals for they were faced with numerous problems and assults from all sides. It is difficult to be innovative and progressive when you are fair game for all. Yet, the hospitals could have done more, for if anyone was acutely aware of the health manpower shortage, it was they.

Perhaps in their efforts to meet this shortage the hospital compounded the problem. For example, because there was a lack of qualified personnel to staff hospital needs, and the needs were not being met by established educational institutions, the hospitals turned to developing

their own educational programs, training a wide range of health personnel. While many of the programs were of excellent quality and developed enviable reputations, many were of questionable value, functioning for the singular purpose of providing manpower for current local (meaning the particular hospital) needs. Many of the hospital programs lacked vision; their interest and concern was not common need, but parochial expediency.

The hospitals cannot really be blamed for this lack of vision. For many of them this expediency was a matter of survival and motivated by public pressure to provide services. If the hospitals are to be criticized it is in the realization that all their efforts were directed toward a contemporary problem and that a concerted effort to face up to the impending critical shortage was not forthcoming. They temporized, but did not project and plan.

This brings me to the fifth and final major factor contributing to the health manpower shortage, specifically, the role of the local, state, and federal governments. The federal government has had an active program supporting research in medical centers and this has undeniably caused a strain on existing manpower. Physicians have been attracted to research, both clinical and basic, and to assist them they have recruited assistants from the existing manpower pool. Nurses, technicians, and hygienists have been lured to laboratories and research centers where the hours are regular and the pay scales usually higher. In general, programs were too often initiated without adequate consideration as to where the staff to man these programs would be obtained. While the federal government has for a number of years had an active program to increase the supply of desperately needed researchers and scientists, it was slow in obtaining authority to increase the total pool of health manpower. State governments often did health manpower surveys, but more often than not these collected dust. State governments had the power to do something about the shortage, yet they, too, failed to exercise their duty. These, then, represent some of the factors contributing to the current shortage. I realize fully that I have made some strong accusations and the generalizations are dangerous. <u>However, it must be clearly understood that no one single factor that I have cited was the contributing one to the health manpower shortage.</u> All of these factors began to merge, then the shortage was developed.

Now I should like to suggest some approaches to meet the shortage. Some are already underway, others in the discussion stage. What they need on our part is a firm and dedicated commitment.

First of all, the professional groups must accept the fact that simply increasing the number of individuals in each profession will not provide the ultimate answer. They must work together in finding solutions to common problems and areas of interest. They must work more closely with educational institutions that are being innovative in developing new levels of health personnel. They must be even more receptive to attempts for developing new careers and providing for the upward mobility for the competent and ambitious individual. They must assume far greater initiative in thoroughly studying the role of each health occupation and must be more cooperative with those who are sincerely interested in studying and

improving the use of health personnel in the delivery of health services. Through these kinds of actions the professions will develop--to use a Madison Avenue phrase--far greater visibility. Our youngsters interested in a health career will see that the health professions are viable, activist organizations, not merely concerned with their own self-interest, but the welfare of mankind. Our youth will be attracted to the health occupations because they present not a self-interest, but the common good.

A next step in reducing the health manpower shortage will require some fresh thinking on the part of educational institutions. Institutions must cooperate with professional groups in ways to improve existing educational programs, to develop new educational programs, and to work together and not at cross purposes. Where professional groups are reluctant to cooperate, educators must assume the initiative. We have always looked to our educators as being leaders and they must assume leadership in meeting the health manpower shortage. They must look to research for ways to improve the quality of patient care and make better use of existing health personnel. They must explore the need for , and education of, new levels of health personnel. And although they might find this difficult, they must learn to cooperate better with other institutions in the community. If this means giving up some of their previously held privileges, then it must be done. We can no longer afford the luxury of protecting vested educational interests if we really believe that the health manpower shortage is critical. The time for cooperative action is now; academic discussions on protecting educational boundaries are fruitless and add fuel to the argument that our thinking as educators has become atrophied.

If one can rationalize health professions educators' inaction in many areas, there is one that cannot be excused--greater use of educational technology and application of the principles of curriculum planning. It is amazing to the observer of the health professions how these professions can be so casual in their approach to the educational process. An examination of the programs reveals a dismal picture: The same old approach in the organization of curricula. The same old teaching techniques: lectures, conferences, laboratories. The same dull use of slides, cluttered with data that are incomprehensible and unreadable beyond the first row in the lecture room. The same old examinations, asking the same old questions with only the answers changing. Worst of all, the same approach to all students when we know that individual student differences exist and student interests vary. Routine, varied only by degrees of monotony, is perhaps the best way to characterize the average teaching program of institutions preparing our future health workers.

What is desperately needed is a fresh approach to our educational programs. We must examine ways to reduce the time spent in formal education. Reducing time, but not sacrificing quality, can be achieved only if it receives the attention it so justly deserves. We must examine ways in which core curricula can be developed. Through the development of core curricula it might be possible to educate various groups of health personnel. Core curricula might point up ways in which fewer faculty could teach effectively larger numbers of different students, thereby reducing duplication of teaching materials and content. We must turn to our technologists to test the use of appropriate teaching materials that can do the job of the

teacher equally well, and in some cases far more effectively and efficiently. Closed circuit television, programmed texts, programmed laboratories, a wide range of self-instructional materials and self-appraisal techniques must be employed and tested. The day of one teacher-one student is long past. It is a luxury we can no longer afford. We must face the fact that in the foreseeable future we will not be able to reduce markedly student-teacher ratios; consequently, we must put the teachers' skills to best use. The physician has at his disposal an arsenal of techniques and devices to treat his patients, yet no one has ever accused physicians of sacrificing quality through the use of these techniques. On the contrary, all of these devices assist them in providing far better patient service. Likewise, teachers must make use of the varied techniques that are available at their disposal. The retort that these are pedagogic absurdities is only a rationalization for inaction; they have been tested in the crucibles of time and experience and have proven their value. If health educators wish to claim the title of "educators," they must start behaving like educators and improve the efficiency of the educational system in which they function.

A great deal more could be said on this subject; my only plea is for more efficient teaching so our students can become practitioners in far less time than is now required.

One final observation about education institutions. The drop-out rate for some health related educational programs is alarming. Therefore, it seems that some internal soul searching is needed to make the educational program appealing to students so that they do not become so easily disillusioned and dropout. I realize the problems and causes surrounding drop-outs in the health occupations are complicated. But a start must be made somehwere--the educational institutions look like a good choice.

Some fresh thinking on the part of hospitals is the third step in meeting the shortage. Hospital administrators and hospital boards have been portrayed as budget watchers. This is a just observation for that is one of their primary duties. However, they too must broaden their horizons and come to the realization that the health manpower shortage is not somebody else's doing but a reality brought about by a host of factors. Hospitals must cooperate with professional groups and educational institutions on a wide range of problems, from working conditions to experiments and research on utilizing new levels of health personnel and using existing personnel more efficiently. Hospitals must continue to guard the well being of the patient, but they must also be more receptive to cooperative efforts with the professional who staff them, and the educational institutions of the community. If these groups fail to assume the initiative on some of the topics previously mentioned, then the hospitals must step into the breach and meet this responsibility.

What I am suggesting in these first three steps is a far more productive dialogue among the professional groups, educational institutions, and health administrators, a dialogue for action such as this conference.

The fourth step calls for a far greater commitment by local, state, and national governments. The federal government has taken significant steps in an attempt to face up to the shortage with the Health Manpower Act of 1968, the first time incentives to develop innovative educational programs were provided. Incentives for producing more health workers

more rapidly with even greater ability were included in the legislation. It is hoped that even greater incentives will be supported by the present administration.

On the state level, a number of states have taken the initiative in exploring ways to increase the manpower pool, how to educate health personnel more efficiently, and how to improve wages and working conditions. As Californians we can take pride in the thoughtful and positive action being taken by our legislators, especially the Assembly's Health and Welfare Committee. It is concerned with the health needs of Californians and approaching these needs in a constructive manner.

A great deal has already been accomplished by local, state, and federal agencies, but a constant vigil must be kept and the various governmental agencies must continue to take an active part in working with all concerned with the manpower shortage. At the same time the public must commit itself to positive actions and such an opportunity will present itself in June, when they can vote on Proposition I, the Health Bond Issue.

The final suggestion is exemplified by this meeting--cooperative efforts in approaching the problem. The health manpower shortage knows no boundaries; consequently, a fresh approach must be taken. Cooperative programs including professional groups, educational institutions, hospitals, lay groups, foundations, and privately supported health agencies must be initiated to approach the needs of the health occupations in a systematic manner. Efforts in recruiting students; improving wages and working conditions; enticing active workers back to active status; encouraging experiments in developing new levels of personnel and varied career ladders; promoting studies on the efficient use of personnel; developing inducements such as day nurseries for married women with children; and promoting the values of a health career are but a few of the cooperative programs that can be carried on.

The health manpower shortage is so vast that no one single effort can correct it. Just as the problem was created by a host of factors, so then can the problem be corrected if we work together.

You are meeting here to explore ways in which to solve the health manpower shortage. The problem you have before you is critical and worthy of your attention. It is a crucial issue because the expectations of our society will continue to rise and every effort will have to be made to meet those expectations. How successful you will be will depend on how you approach the problem. Your efforts here are a testimonial to my idealism that the challenge will be met. The time for action is now.

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A NEW APPROACH TO INTEGRATED HEALTH EDUCATION

It is increasingly evident throughout the United States and painfully evident in North Carolina that there is an acute shortage of people trained to provide patient care services. One of the most critical shortages that faces the health services industry today is created by the lack of physicians available for patient care services at the community level. The need for physician services will not be met solely by increasing the capacity and/or number of medical schools. Increasing the quantity of physicians must continue in the future as in the past to be the prime objective of the medical educational institutions, but this alone cannot fulfill either present or projected needs. If the health services industry is to ever meet the increasing demands for service, it must produce a cadre of professionals at all levels dedicated to the physical and mental well-being of each person in our society. The provision of these services is the primary challenge that confronts the medical profession today.

In 1965, Duke University initiated an effort to alleviate the physician manpower shortage by instituting a program for training ancillary health professionals who could assume that portion of the physician's functions which do not require the extensive educational and professional background of the physician and thereby increase the physician's patient productivity. Since its inception, the twenty-four month professional training program has become formalized into an educational experience incorporating an academic year of basic medical sciences with fifteen months of clinical training and experience to provide an intermediate level professional assistant for virtually each and every type of physician.

During the first academic year of training, the students are enrolled in 1,040 hours of formal training in history, philosophy, and ethics of medicine, basic clinical laboratory procedures, medical terminology, inorganic chemistry and chemical biology, anatomy and physiology, epidemiology, bacteriology, clinical medicine, pharmacology, physical examination and evaluation, clinical chemistry, diagnostic procedures, animal surgery, electrocardiography, radiology, community health, basic principles of data processing, and human growth, development, and behavior. After successfully completing the didactic portion of the training program, the students apply their newly acquired medical knowledge in a variety of clinical settings. Initially, the efforts were directed exclusively toward training physician's assistants in the area of general medicine as the needs in this area were most acutely evident. While the students were receiving their clinical training however, physicians who had more limited clinical interests became aware of the role that this new type of professional assistant could assume within their own specialty; and, consequently, the clinical training has been expanded to include twenty-two specialty clinical programs with several more being developed at this time. Currently students can receive their clinical training in general medicine, internal medicine, and a multitude of medical and surgical specialties.

During the fifteen months of clinical training the students spend twelve months within the medical center and three months in the community-based settings. While in the medical center the students are rotated through clinical services on a four or eight week basis in both required and elective services. All students are required to take eight weeks of training in an

outpatient clinic and emergency room, eight weeks of training on an inpatient service, four weeks of training in an intensive care setting. The elective rotations, centered within the various clinical services, are each eight weeks in duration. The training at the community level during the last three months includes one month in health administration, and two months in association with a community-based physician whose practice is relevant to the student's training. By following this routine, it is possible to comply with the needs of the specialties for specific educational experiences. Flexibility has been maintained on both the didactic and clinical portions of the program. As a result, it has been possible to maintain educational mobility and simultaneously fill the specific specialty requirements while staying within consistent temporal boundaries.

During the course of their training, the Duke University Physician's Assistants acquire an education that includes a broad and intense program in the applicable sciences, plus extensive clinical training in the specialty of their choice. In the hospital setting, the graduate physician's assistant:

1. Takes and records the initial detailed history and performs and records a complete physical examination;
2. Follows the patient's daily progress, taking notes and scheduling a wide variety of laboratory, radiological, and diagnostic procedures as indicated;
3. Does numerous diagnostic and therapeutic procedures including arterial and venous punctures, intravenous catheterizations, intramuscular and intravenous medication administration, dressing changes, venous cutdowns, lumbar punctures, paracenteses, bone marrow biopsies, thoracenteses, and tolerance and diurnal testing;
4. Provides a variety of laboratory studies including urinalyses and hematolgic tests, Gram stains, acid-fast stains, cultures, blood gas analyses, spinal fluid analyses, electrolyte determinations, and stool studies;
5. Carries out and interprets other evaluative procedures including electrocardiography, phonocardiography, and spirometry;
6. Performs and records the discharge physical examination and records the narrative summary to insure completeness of the patient's record; and,
7. Instructs the patient concerning the therapeutic regimen prescribed by the physician.

The clinical office and emergency room activities of the physician's assistants includes the above plus:

1. Triage and first aid for the injured patient;
2. Suturing of superficial lacerations after examination by the physician;
3. Cast application and removal;
4. Organization and evaluation of historical, physical, and laboratory data for presentation to the attending or consulting physician;
5. Participation in the evaluation and management of emergency conditions such as status epilepticus, status asthmaticus, cardiac arrest, pulmonary failure, acute traumatic shock and cerebral and vascular accidents; and,

6. Explanation to the patient of the preparatory steps, the effects, the after effects, and the relevance of the various diagnostic and therapeutic procedures such as roentgenograms, contrast studies, and nuclear scanning procedures.

These skills enable the physician's assistant to handle many of the tasks that do not require the judgement of the highly trained physician, and his preparatory education enables him to learn virtually any procedural task utilized in patient care. While the physician's background is most essential in analyzing data to make the diagnosis and prescribe an appropriate therapeutic management program, the physician's assistant is trained to assist in the accumulation of data and thereby supplements rather than competes with other allied health professionals.

With the creation of this new category of allied health professionals, questions concerning the degree of self acceptance, physician acceptance, and patient acceptance, have been raised. Generally speaking, both patient and physician acceptance of the graduate physician's assistant have been high. Among the patient groups studied there were no patients who exhibited a negative attitude toward the incorporation of the physician's assistant into the health team. The degree of patient acceptance correlated with the patient's understanding of the assistant's role and was related more specifically to his level of education attainment, and income range. It was found that patients with six years or less of education and an income level of below $5,000 per year were not enthusiastic in their acceptance of the assistant. This feeling was also expressed by highly affluent patients who felt a loss in status when they paid for "just a physician's assistant." The middle socio-economic group who had sufficient education to understand the nature of the role of the physician's assistant was, however, enthusiastic in their acceptance. Their enthusiasm seemed to be related to the increased personal attention provided by the physician's assistant and the fact that they were able to communicate with the assistant in a more meaningful manner with reference to their own disease process. It was also demonstrated in the study that patient acceptance seemed to be highest in the rural community where the physician shortage is more severe.

A recent cost analysis revealed that approximately the same expenditure on a per annum basis was required for training physician's assistants as that required to train medical students. The overall cost is substantially lower, however, because the professional training is only two years as compared to seven or eight years for the physician.

The degree of augmentation of a physician's patient productivity by using an assistant is under objective study at this time. Augmentation figures of 30 to 95 per cent have been estimated by physicians using a graduate physician's assistant. While the exact impact of such assistants in a variety of practices must await further evaluation, even if the minimum figure of 30 per cent augmentation proved accurate, and if half the nation's physicians used such an assistant, the manpower effect would be equivalent to an increase of 50,000 physician man years per year.

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The use of new types of manpower in the health field can present legal difficulties in view of the current licensing laws for medical personnel. All states have licensure laws to regulate the practice of medicine for the protection of the health and safety of their citizens making an unlicensed person liable for any action within the scope of a licensed profession. The initial question was, therefore, whether graduates would, by their activities, infringe upon the sphere of persons performing under such mandatory licensure. The problem was considered, in 1966, by the North Carolina Attorney General who issued the advisory opinion that the performance of the projected physician-supervised activities would not contravene the licensure laws of the state, and the program has operated thus far without legal difficulty. Following a series of legal conferences at Duke University, there has been an opinion expressed by the participants that future efforts should be directed toward drafting a general statute authorizing supervised delegations by physicians with responsibility for determining the qualifications of the assistant being vested in the State Board of Medical Examiners. It may be that these efforts are inspired by an over-abundance of caution as the physician's assistant seems to be fitting harmoniously into the scheme of health care delivery; however, a definite legislative sanction would go far in curbing lingering doubts as to the risks inherent in employing such personnel.

The question of professional liability insurance has also been investigated. Initital coverage, in 1966, was limited to students in the medical center, and they were automatically included under an existing policy carried by the medical center. As students moved outside the medical center for community-based experience, companies providing coverage for the physician-instructor extended coverage to include the physician's assistant at the same rate for his other employees. In 1969, as an expanded class was assigned to physicians from coast to coast, the issue of professional liability insurance was raised on a national level. As a result of the inquiries and because the question was relevant to all related programs, the problem was placed before the major professional liability carriers listed by the American Medical Association. These carriers, in conjunction with the recommendations of the Insurance Rating Board of New York, expressed a willingness to furnish professional liability coverage to the physician and hospital utilizing assistants at a reasonable rate and to the university-trained physician's assistant as an individual at a rate approximately 50 per cent of that paid by the supervising physician.

Although great strides have been made in developing a career for the physician's assistants, much as yet has to be accomplished. At this point in time, the constraints on further development are similar to those shared by many of the other health professions and are due, in large part, to the lack of integration of educational efforts between various professions and between various types of educational institutions producing the professionals. The idea of career mobility encompasses the notion that people will perform at various levels of activity and responsibilty and that a person should be able to progress upward through

the system to the highest level of his capabilities without being blocked by artificial barriers. When specific training in the health services is coupled with general education in order to prepare people for a variety of related functions, problems begin to develop.

In the health field, there are a multitude of education programs preparing people for a variety of health care functions. Unfortunately, when a person has been prepared to function in one activity and wishes to move up to a more sophisticated activity, the education which he has received for the first activity is not particularly applicable to the educational preparation necessary for the more advanced activity. This discrepancy is readily evident in the area of nursing where there is no progressive mechanism by which a practical nurse can become an associate degree registered nurse or associate degree and diploma nurses can progress to the baccalaureate level. Similar impediments are faced by physical therapy assistants who desire to become physical therapists and discharged medical corpsmen who desire to transfer their skills to a civilian setting. Recently, many people across the country have pointed out the need for reconstructing curricula to more adequately parallel the functions within the health care industry. Perhaps a better approach might be to admit the fact that little structure exists at this time and to view this as a need to create structure from the ground up. One of the reasons that so little structure exists within the education of health professionals is that few alternatives are available as long as antiquated educational procedures and systems are maintained.

Before any structure can be devised, professional functions at all levels must be clearly identified. The role of each profession must be specified in detail so that the difference in knowledge, skill, and level of responsibility between successive professional steps can be determined. The second step of structural establishment is to develop the ability of evaluating what people as individuals know, and giving them professional and academic credit for what they know. When this level of expertise is achieved, then and only then will the way be clear to establish relevant and individualized educational programs. To get to this point, it is not only necessary to clearly define specific professional objectives, but also to restructure education in the junior and senior colleges. The antiquated time-oriented approach to education must be replaced by achievement-oriented education.

Technology today is sufficiently sophisticated so that this is not an unrealistic objective. If educators are willing to move in this direction, the interrelationship necessary for career and educational progression between junior and senior colleges would be simultaneously established. Both upward mobility and lateral transferability would be easily achieved. The need for core curriculums would be satisfied in that each profession could extract from the whole structured body of knowledge that portion applicable for its students. And, finally, continuing education would be nothing more than adding new modules of learning in specific areas to the individuals already established body of knowledge. As people acquired new knowledge, they would then be capable

of assuming new responsibilities within their professional scope. Such a system would enable people to progress to their level of competence as well as maintain a continuity of capability within each profession.

The health care delivery system in this country is faced with a critical shortage of people at all levels in relationship to the demand for services. If these demands are to be satisfactorily met, new approaches must be utilized wherever possible. In order to solve the manpower crisis, people at all levels will need to be trained, and to do this, mobile career opportunities will have to be established. By truly developing a mechanism for progressive advancement, adequate numbers of qualified people will be attracted to the industry. Only when the necessary people are available can the necessary number of properly trained people be produced. The numerical majority will be increasing at the technical level and the junior colleges of this country will have to assume the responsibility for training these people. For those who wish to progress, the education they receive at the junior college level must be transferable to the senior college and university, so that "dead-ending" will not impede advancement.

At Duke University two innovative aspects in health education have been demonstrated. One, a new professional career that can assist in overcoming the physician manpower crisis is both feasible and desirable; and two, stepwise progression for career advancement is both feasible and desirable. In the 1960's, a giant stride in research produced new techniques and procedures applicable in the diagnosis and treatment of disease processes. The challenge of the 1970's will be to implement a delivery system that will effectively transmit these benefits to society as a whole. Today, the necessary knowledge and technology for developing such a delivery system is available. The only impedance is the prejudice inherent in relying on established educational processes. The first step toward success is to overcome the limitations in visibility created by that prejudice.

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SOURCES OF SUPPORT AND PLANS OF ACTION FOR ADMINISTRATORS INITIATING OR OPERATING BIO-MEDICAL TECHNICIAN PROGRAMS

At this stage in the conference the major parameters affecting programs for the education of bio-medical technicians have been very ably defined. The philosophy and mode of operation, so well illustrated by the extensive and close cooperation of the San Diego Naval Establishment, the hospitals in the area, the bio-medical equipment manufacturers and suppliers, Grossmont College, and the community at large, functioning through an advisory committe, have also been illustrated.

The following, therefore, is addressed to those administrators and others who now must know what action they may take and what problems may beset them as they seek to initiate or operate a bio-medical technician related program.

A major consideration is always the source of financial assistance for new or improved programs. Some assistance may be available under legislation administered by the U.S. Public Health Service. There are those present who represent the U.S. Public Health Service who can describe these potential sources of financial assistance. Another source for junior colleges or divisions of four-year colleges or universities may come from funds for higher education. Administrators of institutions doubtless would explore these possibilities.

Programs for the education of bio-medical technicians and similar technicians may be supported under the federal Vocational Education Act as amended in 1968. Most of these funds are administered by the state directors of vocational education, whose offices are usually located in the capital city of the state.

The appropriation for fiscal year 1970 for the Vocational Education Amendments of 1968 (PL 90-576) totaled $376,207,455. This appropriation was over $90 million more than the proposed 1970 budget. In a year when the Congress and the Administration are cutting appropriations and holding down spending to combat inflation, an increase of one third is a solid indication of the importance attributed to vocational education by both the Congress and the Nixon administration.

A major provision of the Act stipulates that highest priorities for expenditures of grants to the states be for persons living in rural and urban areas where there is a high percentage of disadvantaged or unemployed persons. Special attention is paid to students who have dropped out of school and who need a second chance.

A special appropriation of $17,000,000 for disadvantaged persons is included in the fiscal year 1970 appropriation under the 1968 Amendments. These funds do not require matching with state and local funds; they should provide the special kinds of assistance required to permit students to develop their capabilities and to overcome academic

and other handicaps so that they can participate in regular programs with good expectation of successfully completing them, obtaining employment, and growing to greater responsibilities and rewards.

Post secondary institutions can serve disadvantaged, educationally handicapped youth in a way that no other institution in the nation can. The Vocational Education Ammendments of 1968 offer great potential for increased programs, opportunities, and responsibilities for public and private post-secondary educational institutions, and, especially, for community and junior colleges. Note the declaration of purpose in the Act, with its specific and implied mandates to provide vocational education programs and services:

> It is the purpose of this title to authorize federal grants to states to assist them to maintain, extend, and improve existing programs of vocational education and to provide part-time employment for youths who need the earnings from such employment to continue their vocational training on a full-time basis, so that persons of all ages in all communities of the state--those in high school, those who have completed or discontinued their formal education and are preparing to enter the labor market, those who have already entered the labor market but need to upgrade their skills or learn new ones, those with special educational handicaps, and those in post-secondary schools --will have ready access to vocational training or retraining which is of high quality, which is realistic in the light of actual or anticipated opportunities for gainful employment, and which is suited to their needs, interests, and ability to benefit from such training.

It provides a new definition of vocational education which emphasizes "instruction related to the occupation or occupations or instruction necessary for students to benefit from such training (including field or laboratory work and remedial or related academic and technical instruction incident thereto)." Federal funds under different parts of the Act require varying degrees of matching with state and local funds, ranging from dollar-for-dollar assistance for the basic programs up to 100 per cent federal funds for some other parts. Matching is statewide and not by categories as in the past. The main provisions of the Act which may be important to the administration of bio-medical technician programs are discussed below.

Title I - Vocational Education

General Provisions and State Vocational Education Programs. The Act provides grants to states to assist them in conducting vocational programs. The FY 1970 appropriation for the basic program was $307,497,455.

This fund is administered by the state board for vocational education in each state, through the state director of vocational education, under a state plan. Each state is the master of its own programs under the Act.

To insure the intended emphasis under the Act, significant portions of the fund are set aside for the disadvantaged, for post-secondary education, and for the handicapped. Specifically these are:

> Not less than 15 per cent of the funds available for state vocational education programs shall be used for the disadvantaged.
>
> Not less than 15 per cent of the funds available for state vocational education programs shall be used for post-secondary vocational education.
>
> Not less that 10 per cent of the funds available for state vocational education programs shall be used for the handicapped.

An additional $17 million was appropriated for education of disadvantaged youth in areas of high youth unemployment and school drop-outs. These dollars require no matching with state or local funds.

The Act created a National Advisory Council on Vocational Education appointed by the President. The 21 members are to be representatives of various groups and interests highlighted in the Act. They will include persons having special knowledge of post-secondary and adult vocational education. One third of the membership will be from the general public. The Council will meet no less than four times a year and will advise the U.S. Commissioner of Education concerning regulations for operating programs; it will review the administration, operation, and effectiveness of programs, and will distribute results of the program evaluations.

The Act also requires states to establish state advisory councils. Their responsibilities are similar to the national group, and they, too must have a wide representation. One category of representation for state councils includes a person or persons "representative of community and junior colleges and other institutions of higher education, area vocational schools, technical institutes, and post-secondary or adult education agencies or institutions."

Exemplary Programs and Projects. The ammendments authorize grants "to stimulate, through federal financial support, new ways to create a bridge between school and earning a living for young people, who are still in school, who have left school...or who are in post-secondary programs of vocational preparation, and to promote cooperation between public education and manpower agencies."

In FY 1970, $13,000,000 was appropriated, 50 per cent of the funds may be used for a program of grants and contracts by the Commissioner for exemplary programs and 50 per cent by state boards in making grants to or contracts with local educational agencies or organizations for planning, developing, and operating exemplary occupational education programs.

Cooperative Vocational Education Programs. The Act provides grants to the states for cooperative vocational education designed to prepare students for employment through alternating work and study (co-op) arrangements. The fiscal year appropriation was $14,000,000.

This part of the Act opens a whole gamut of potential programs for specialized employment in enterprises or agencies whose environment, facilities, and work cannot adequately be stimulated in schools. It permits students to work part-time on the job and at the same time pursue related study part-time in an educational institution, thus making training possible where none exists. For example, bio-medical technicians may be taught in a community college or a technical institute cooperating with hospitals and producers of bio-medical equipment where the students can work for pay and learn in schools in one unified program. Other possible examples are: air traffic controllers, highway department technicians, water and wastewater technicians, police science and law enforcement personnel, and technical skilled construction workers. Programs may be reimbursed with federal funds up to 100 per cent.

Work-Study Programs for Vocational Education Students. This program is an extension of the work-study provisions in existing laws, raising the federal matching to 80 per cent. It is for students aged 15 to 20, who have been accepted for enrollment as full-time students in vocational education programs. Priority is given to local educational agencies in communities having substantial numbers of youths who have dropped out of school or who are unemployed and need the earnings to continue vocational education. The appropriation for fiscal year 1970 was $4,250,000.

Curriculum Development in Vocational and Technical Education. In fiscal year 1970, $880,000 was appropriated for curriculum development. The Commissioner, after consultation with appropriate state agencies and the National Advisory Council, shall use funds to make grants or contracts with colleges and universities, state boards and other organizations to promote the development of vocational education curriculum materials.

Title II - Vocational Education Leadership and Professional Development Amendment of the Higher Education Act - 1965.

This Title amends the Higher Education Act of 1965 by adding provisions for vocational education leadership and professional development This will enable the Commissioner to give leadership development awards (stipends) to vocational education personnel for taking approved vocational education leadership development programs. Funds will include a cost-of-education allowance payment to the institution of up to $3,500 per year.

The Act also authorizes the Commissioner to make grants to state boards to pay the cost of cooperative arrangements for the training or retraining of vocational education personnel, including exchange of teachers with technicians through industrial in-service training and special institutes. The Commissioner is required to give special consideration to funding programs designed to familiarize vocational teachers with new curricular materials.

Funds to support the development of vocational education are available through the U.S. Office of Education, Bureau of Educational Personnel Development.

Financing of new programs is always a problem. In the last analysis probably the greatest problems confronting the administrator are those involving people essential to a new or existing program, particularly teachers and students. Usually if the need for a program is sufficiently demonstrated, money to support it can be found. The necessary facilities, equipment, and materials can be obtained, but the quality and success of a program will be chiefly determined by the quality of its teachers and by the number and characteristics of its students.

Instructional and Related Staff. The education of teachers to prepare special kinds of technicians is a matter of great importance to the administrator, but it must be observed that only a very few of our institutions of higher education have seriously and realistically addressed themselves to the problem of preparing teachers for these occupational specialty programs. Qualified teachers can be found, though it may be difficult, and once employed they may be provided with sufficient encouragement and assistance from the school administrator to function acceptably and even excellently. It is hoped that federal funds under Title II of the Vocational Education Act as amended in 1968 or similar sources will add incentives to our universities and colleges to improve technician teacher preparation.

Student Recruitment and Student Development. A far more significant problem is that of recruiting and qualifying students for technical programs. However desirable it might be to aspire to recruit from the top 25 per cent of high school graduating classes it should be recognized that those who probably will comprise the majority in technical education programs will not have distinguished themselves by the highest order of academic excellence in high school. Many programs which have adequate funds, equipment, facilities, materials, and staff suffer from a lack of qualified students in sufficient numbers to make the program economically efficient as well as effective for the students and their future employers.

Bio-medical technicians are persons who must assume important responsibilities, therefore, no compromise with ignorance is permissable in their preparation; and they must be prepared to function at a level commensurate with their future responsibilities. The student attrition rate of 40 to 60 per cent which often occurs in technical programs is unnecessary and unacceptable in terms of human values and socio-economic accountability.

Because recruitment of students for technician education programs continues to be a very real problem, there has been a significant growth in the number of institutions which provide "student development" or student opportunity (pretechnical, post-high school, remedial preparatory programs). (See Pretechnical Post-High School Programs, A Suggested Guide, published by HEW, Office of Education, 1967, available from the U.S. Government Printing Office, Superintendent of Documents, Washington, D.C. 20402, price-45 cents).

The increasingly critical shortage of specialized technical and supportive workers on the one hand, and the evident supply of educable persons on the other--those who have left high school or who have been graduated from high school but who are not pursuing organized programs of education to prepare them for careers in a technological society--represent an unprecedented challenge to educators of technicians.

For every student who enters a program there are perhaps three or four who either apply for admittance and are rejected, or who do not apply because the do not want a four-year baccalaureate program or believe they cannot be successful. Nearly half the students who enter college programs directed toward a baccalaureate degree do not complete the program or receive the degrees.

The problem of meeting the challenge of a large population of able but not fully qualified students for educational programs to meet the technical worker requirements essentially requires that organized student development services be provided for willing and motivated students. These services must start at the point in educational preparation attained by each individual and provide the missing reading, science, or mathematics required for successful mastery of the occupational program to which the student aspires.

These student development programs must be "individual," in the sense that they provide a special program for each individual in order to repair his academic deficiencies. They must be taught in such a way as to relate to the special field of interest in which the particular student expects to make a career. The preparatory program must be tailored to each individual's needs and must include from the beginning some direct involvement (usually in laboratory work) in his special field of interest. Groups of students with similar gaps in their academic preparation can be formed into classes large enough to justify special staff, facilities, and teaching programs to serve their needs.

Administrators of programs which remove the academic deficiencies of students as a part of their occupational study program cite the following benefits: The morale of both the students and the instructor is improved; the number of students who drop out because of academic failure is greatly reduced; the total cost of educating these specialized occupational personnel is lowered because of better use of facilities, teachers, and fewer failures; finally, better qualified graduates are produced

making them more sought after by employers.

Such preparatory programs usually allow an individual to arrive at a degree of productivity and responsibility in 3 to 5 years; normally this would take him 12 to 15 years if he entered and picked up his education on the job by diligent work and study. This means a net gain of ten years of high productivity, benefiting both the individual and his employer, as a direct result of the student having an opportunity to overcome his academic deficiencies and successfully prepare himself for higher level employment.

Many other challenging subjects might have been emphasized in this brief presentation but for those who will initiate, expand, or operate programs for bio-medical technicians or similar specialists the subjects discussed may provide the basis of action now, with the promise of success based on tangible evidence of success in existing programs. The present urgent needs will not permit the luxury of rediscovering the wheel, especially when good round wheels are already available!

Walter J. Brooking
Program Officer
U.S. Office of Education

THE BIO-MEDICAL TECHNICIAN AS A MEMBER OF THE HEALTH CARE TEAM

For the past few years, it has been popular, and I might add, helpful to portray health care as a team effort. The physician, as the captain or quarterback, calls the play. The rest of the team, the nurses, the therapists, the technologists, the administrators and so forth all blend efforts to facilitate orderly and effective diagnosis, prescription, and treatment.

Idealistically, the team concept is sound; pragmatically it is missing certain ingredients of knowledge and experience that are necessary for streamlining its functions. For example, many of the team members do not train together or practice in close proximity. Yet the performance of each influences the outcome of patient care. With these communication distances, it is little wonder then that occasional charges of offsides, out-of-bounds, illegal procedures, and unsportsmanlike conduct are parlied among the professional groups that make up the team.

Perhaps then a kind of spring training, which we can identify as entry level education, represents a key to the improvement of team care from that of Class B to Class A in performance. What I am suggesting is that there is a causal relationship between preparation and performance. The final results are measured in on-the-job performance. Members of the preparation team include the publics, patients, employers, educators, employees, and professional groups. One might appropriately argue for the inclusion of other members. It does not seem that the team providing care is a logical extension of those involved in preparation for team participation.

To have such a team is a "coach's dream." What knowledge and experience! What potential! However, we have not reached the milenium and let us now place this metaphor in better perspective. How does one elicit the views of these members, build concensus, establish rational entry education and improve job productivity. One approach is to ignore certain of the members and proceed individually with the planning of educational programs. A second approach is to listen to the members but proceed as originally planned. The third is to listen, probe, modify and cooperatively design. Of course, I support the latter one believing that educational program design can be done through cooperative participation of representatives of the team members whether at the local, state, or national level.

Fortunately, we do not have to pursue these efforts from zero base knowledge. Your accumulated knowledge and experience represents a great resource. What I should like to do then is to reinforce some of your views about entry level education and perhaps touch on issues raised by other team members.

Let me then proceed by raising some "diagnostic questions" and then "prescribe some treatments." Mentally, I hope that you will enlarge and refine the responses. The questions and responses are not intended to be either comprehensive or exact in scope but rather are asked with the intent to prod better teamwork on the part of all members.

1. What are publics and patients telling us that have implications for preparation of health workers?

Hospitals and nursing homes are typically viewed as "places where one goes when one has to." Once there, he has relatively minor control of what happens. The decisions relating to diagnosis, prescription and treatment are those of the physicians and those to whom he delegates tasks. He does not have sufficient knowledge to intelligently question their propriety. He acts on faith.

In return for this placement of trust in practitioners, he expects some very basic considerations of which he feels fairly competent to judge. First of all, he desires a successful remedying of the illness. Health is valuable and he is willing to sacrifice much to restore it.

To supplement his lack of knowledge about medical procedures, he expects respectful handling as a person, or "tender loving care." He wants to know why certain tests are being made, and how the information will be used. He wants to know of progress in recovery or the lack of it. He worries about the costs despite the fact that some of the charges will be covered by third party payers. Noncovered items such as physician services, drugs, and therapy result in bills that can deplete savings or increase debts.

The needs and expectations of the patients are legitimate elements of curricula building. Sensitiveness to patients, explanations of procedures, and gentleness in care can be learned and practiced by practitioners. Deficiencies in care will be exposed by patients. The non-responding institution or practitioner will increasingly find community groups that will ask for and expect changes. Newspaper articles daily confirm such press for changes.

2. What kinds of assistance can employers bring to the design of entry level education?

For want of a better target, program inadequacies and failures are generally attributed to lack of commitment by employers. Credit for success often escapes them. However, it is not an exaggeration to say that success or failure is significantly influenced by them. They must be involved in program design because they are responsible for the use of the employees. The other team members must have the savvy to examine the several constraints on administration in the use of manpower, or risk placement of students who are improperly educated and poorly used.

First, the administrator is caught in the bind of containing patient care costs while expanding services and upgrading salaries and jobs of personnel. Thus, one of his first questions will be what is the cost of such an education program to the hospital or nursing home? How will these trainees perform differently or better than current employees. How will patient care be improved. Will the use of such individuals result in more services for the patients' dollars?

Second, within the institution there is a diversity of employees. A health care team involves operations that include practitioners, food preparers, housekeepers, researchers, laundresses, engineers, managers, volunteers, and so forth. Add to these requirements, the outlays for equipment and special facilities and the result is a complex organization. Moreover, the various publics are monitoring the institutions' performance or lack of it and thus are holding institutions accountable for their services.

In the past, employers have tended to nod agreement to the wishes of educators and professional groups. Now with the pressures for cost containment, with the increasing unionization of personnel, with greater specialization, and with changes in manpower needs and uses, employers will increasingly test the proposals and actions of professional groups and educators.

Third, the introduction of programs to train needed personnel will require greater use of clinical facilities. This in itself necessitates employer participation. In some areas of the country, employees are already asking for additional pay for overseeing the work of trainees. Undoubtedly, we are approaching the time when contractual arrangements between education institutions and health care institutions will be essential to govern the use of clinical facilities and staff. Cooperative arrangements are like a two way street with responsibility and accountability required of both.

3. <u>What are the contributions of educators and educational institutions in designing entry level health education programs?</u>

For soundness of learning and program design, the educator is looked to as the one most knowledgeable about formulating program objectives, organizing the learning activities, conducting the program and assisting with the evaluation. By nature, educational program development is a cooperative kind of art. Employers must furnish the job requirements; educators must tailor the courses to the job requirements. Such a process necessitates regular reassessment of the didactic and clinical portions to insure that programs remain current.

At the present time, there are thrusts for change in which educators hopefully will exert leadership. The first is a call for the analyzing and synthesizing of common courses generally taken by students entering health occupations. There has been too much talk about and criticism of the core curriculum concept but with little effort to experiment or demonstrate its potential or limitations. What is needed now is documentary evidence.

Second, extensive pressures are being exerted by unions and minority groups for the institution of career mobility ladders. The cry has been sounded, "No more dead-end jobs and no more low pay." Their expectations are that employees with interest and potential should be able to advance to higher job levels through additional education. On the part of employers, career mobility ladders will require better job descriptions

and educational assistance such as released time for educational courses, scholarship aides, tuition reimbursement and greater in-house training. For the educators, it means streamlining of courses to provide greater accessibility, more flexible time arrangements, better sequence and continuity among courses.

Third, unions and employees are dissatisfied with educational requirements that do not build on an employees previous work experience and education. They are asking for equivalency measurements that will permit advanced placement on the job or in the educational program. The necessity to move backward to a level of no experience and training before advancing to a higher job level will not be tolerated much longer. This is not to suggest that good health care is to be compromised in order to provide job mobility. The requirement is for orderly routes to progression with greater flexibility in the use and education of employees. Again, less criticism and more experimentation and demonstration are needed.

4. What are the contributions of professional groups in the determination of entry level educational programs?

Professional groups have made significant contributions to employees of common educational backgrounds and job functions. Unquestionably, they have played the important role in increasing the status and economic gains of their members and have actively upgraded educational and performance requirements.

To be a more effective member of the team they are now being called upon to examine their expectations in the light of those of other professional occupational groups and of those of the other members of the team. Accomodation of new knowledge and technology, creation of career ladders, and consolidation of educational requirements necessitate a re-examination of each groups' objectives as they relate to team performance.

Two trends are noticeable among professional groups, one is that they are becoming more trade oriented by serving as the bargaining agent with the employers. Second, some members of professional groups who are both dependent on and independent of the health care institution are seeking separate patient billing or fee for service. One knows what health care administrators will think about these developments. One can guess how consumers will react.

These two trends raise a number of questions about a professional group's influence on educational requirements, accreditation, certification, and collective bargaining. If one were to speculate it seems that inter-occupational rivalry will rise. Unions will likewise join the competition.

However, these trends will be modified. Professional groups who cannot work beyond their members' interest, however honorable, may structure themselves out of the market. The pressures for cost containment and for flexibility in the use of manpower are already significant. If the teams' members cannot play as a team, new members will be added to the team and provide the essential services.

In summary, I am calling for greater cooperation among those individuals and organizations responsibie for the design of entry level education programs. The task will not be easy for the initiators of such actions. They will encounter inertia, vested interests, divergent goals--to name only a few. However, progressive leaders within and outside of the health field are urging these kinds of changes--changes that will provide the bio-medical technician with active team membership and a bright future in health care insitutions.

E. Martin Egelston
Director, Division of
Health Occupations Education
American Hospital Association

LET INDUSTRY HELP

Dr. Shimkin, ladies and gentlemen, first I wish to thank Mr. Kenneth Skaggs of AAJC for asking me to speak for the Office of the Chancellor, California Community Colleges, in substitution for Mr. Leland Baldwin, Assistant Chancellor. When I wrote my speech earlier, I found upon examining the printed hand-outs that it would be a reiteration of the speeches before and after me. This morning I will make some short remarks on community college aspects of planning programs for technicians in the bio-medical fields.

Because many of you were at last year's conference, I do not wish to repeat the same kinds of things that were said then. Therefore, may I ask how many of you were hear last year? (Show of hands demonstrated over 60 per cent were present last year). And also, how many of you understand the function of the California community colleges? (The response was well over 60 per cent).

Since so many of you are aware of our history in California and the activities in which we participate, it would be redundant for me to go over this material for you. I would like to point out some facts of which we must be aware when planning for new programs: The first is regional planning. This is an absolute necessity so one college does not duplicate the program of another which is in an immediate vicinity unless the need is very great. Highly qualified instructors are most hard to find and finances are equally so, therefore, it behooves us to do serious planning among ourselves to get the most for our money and the best educators available to make a strong program.

Second, we must go directly to the industry that manufactures and uses the bio-medical electronic equipment of which we are talking and ask them to be partners with us in a cooperative venture to make our programs relevant and to turn out a graduate who is able to participate immediately as a full partner. Because industry has complained in the past that the new graduate must be re-educated, we must use guidance and direction from industry and have them tell us what the student needs to know in order to be a competent, skilled worker upon graduation. We do not expect them to write our curricula, because they do not profess to be curriculum experts. Nevertheless, they should be able to participate fully in an advisory capacity in our programs. We also should expect them to offer us the opportunity to have our students participate in the uses of equipment and the learning of knowledges necessary for use in the industrial plant or health facility in order for the program to be real.

Third, because this bio-medical electronic equipment is so very expensive and becomes obsolete in a matter of months due to constant research and change in the industry, it seems extravagant to purchase large amounts of bio-medical electronic devices. May I recommend to those of you who are planning this type of program for your college, you need to approach the local manufacturers and make arrangements with them on a loan or lease basis for use of current equipment. You may find that some of the industrial groups are willing to write off a piece of equipment or two and allow

your college to use it until it becomes obsolete. I can see there are some doubtful looks, but many of these industrialists have stated to us that no one has approached them about this, and I suspect that if you people are genuinely sold on providing health manpower in these fields that you ought to be able to sell this idea to your local industry, i.e., Westinghouse, Ling, etc., for use of their equipment.

I am sure that you have not heard anything new or unusual from me, except perhaps the recommendation of actual participation by industry in our programming as teachers, advisors, and interested consumers.

May I wish you success in your efforts to obtain equipment. Again may I say, please do serious regional plannings and investigations of job opportunities prior to your recruitment for students in these fields.

Do not forget to include some of your recent graduates in future follow-up evaluations as well as older practitioners.

Jean Clawson
Statewide Consultant
Bureau of Vocational-Technical
Education
California Community Colleges

THE HEALTH INDUSTRY AND THE COMMUNITY COLLEGE

I am delighted to have the opportunity of being on this lovely campus to visit again with some of my associates; to be educated; and hopefully, to educate. My comments this afternoon will come from the viewpoint of a community college dean, one who must continue to administer an on-going program to serve the health manpower needs of our community while those in higher places involve themselves with concept and philosophy.

I shall focus my comments initally on the broad field of health occupation education and reserve my comments on the apparently emerging health occupation of bio-medical engineering technology until I am nearer the end of my presentation--and the door. I have been asked to touch upon several specific topics, and I hope you will understand if the presentation appears somewhat disjointed.

Let us first look at the student, the area of prime concern in education. The first thing that strikes me about most of the various health programs being conducted in community colleges is that virtually every program seeks to obtain the top ten per cent of students in scholastic ability. If we step outside the bounds of the health industry, we find that this is no unique position, that virtually all programs on the technical level seek the top ten per cent of the student body and actively screen to find them. What should be obvious, of course, is that no program health or otherwise, can claim as its own jurisdiction this elite group of academically talented. What perhaps makes this most discouraging is the recognition that the "top ten per cent," in fact, denotes a <u>category</u> of achievement, and it may well be an innappropriate category for most occupations. I submit to this group that it is perhaps time for all parties concerned to look closely at each health occupation and determine as precisely as possible just what kind of combinations of abilities are really needed to assure success in the individual's chosen occupation.

A great deal of conversation takes place in most meetings concerned with health occupations on the need to improve counseling services at the junior high and high school level. There is much that can and should be done certainly to assist the junior high and high school counselors in their already difficult task, but it is folly to expect that any great progress is going to be made in acquainting all counselors to the needs of the health industry when these needs have not yet been clearly determined by those involved. Like most of you, I have lost count of the steadily proliferating number of programs which come packaged under the label of allied health. As closely involved with the health industry as are the participants at this conference, there are few, if any, among you who can speak knowledgeably about any significant proportion of this group of occupations. It is completely unrealistic to assume that counselors will be able to do what practitioners cannot do. Perhaps the best that we can hope for is the development of a general awareness of the needs in the health industry and the continued reliance upon professionals in the field and teaching staff in the community colleges to make the students aware of the health occupation opportunities available in their community or region.

The health programs as they exist today are tightly bound by tradition and provide little or no upward mobility. Perhaps this picture is changing. Let us hope so. A student today is a relatively sophisticated person; and when these two facts of life are coupled with the relatively low pay of most health occupations, we could well have discovered the formula which has resulted in the manpower shortage in the health areas.

Let us recognize that students also have needs. The planning for health occupation education programs has too long neglected the needs of the student. I submit to you that this lack of concern for the students enrolled in the health programs is beginning to create a climate whereby health occupations are losing some of their glamor and appeal. Students are seeking and finding opportunities to serve humanity in an increasing variety of non-health programs. The confusion and proliferation which continually surrounds discussions of health occupations is not lost on students today. Those of us in health occupation education have pointed out with some pride to our positive efforts in helping to close the manpower gap in the health industry. But perhaps we are creating an illusion instead. There can be little doubt that both the numbers of programs and the numbers of students enrolled in health occupation education is increasing, but there are disturbing reports, largely unsubstantiated reactions to date, which are suggesting that the numbers of students in health occupation education nationally is really stagnating, that the growth we see is really an illusion based upon an increase in the numbers of students in existing programs. More data will, obviously, have to be collected, but until some national figures are available, I would urge you all to look closely at the enrollments in health occupation education programs in your state.

Let me deviate for a moment to ask what may very well be a rhetorical question since it involves the allocation of institutional resources and is, therefore, an almost wholly local matter. One of the earlier speakers cited a statistic which reveals that the average medical technologist remained in his chosen field of work for only two and a half years, which included the time to train that individual. My question is this: To what extent should the individual community college allocate its resources and encourage its students to enter into an occupational field which cannot itself retain its employees? Many people view the manpower shortage in health occupations as being the result of a lack of well-qualified applicants and, therefore, a function of education. If this statistic is true, and I have heard other similar reports, it could very well be that the manpower shortage experienced in the health industries is not a function of education, but a problem largely for the employers to resolve. Few industries would long survive with an employee turn-over rate equivalent to this one.

Let me quickly leave that sour note and move on to the second area of concern felt by most deans--that of curriculum development. Those of us associated with non-health programs through the years have observed and participated in what appears to be an efficient and effective procedure for the development of curriculum. This procedure relies heavily upon an advisory committee to assist the educator

in the development of curriculum. In the non-health area, the advisory committee assumes the position of defining as clearly as possible what the students need to know and what the student needs to be able to do to be successful at the entry level of employment of his chosen occupation. These two spheres of knowledge must be stated in measurable terms so the both the educator and the employer group can participate jointly in the evaluation of the program and its product. After the employer group, which should include some practitioners, has defined in measurable terms what the student must know and be able to do to be a success in that occupation, it becomes the responsibility of the educator to determine how to meet these objectives. The development of the curriculum, the gathering of the resources, and the implementation of the program is the responsibility of the educator, not the employer group. It would, of course, be folly for either group to ignore the knowledge possessed by the other, but there should be no confusion about each group's role in this process. If the practitioner becomes involved in the development of the curriculum, he is most likely to reflect a mirror image of his own experience in the development of another curriculum. This reflection will seldom take into account the technological changes which have occurred in his occupation since his formal education ended, and it will almost totally ignore the body of knowledge developed by the behavioral sciences upon which the educator draws heavily. There is also a real danger that the practitioner will develop the wrong program for the wrong kind and the wrong group of students.

I submit to you that part of the problem of the proliferation of health occupations is the involvement of non-educators in curriculum. The practitioner alone will have the tendency to place his own occupation first in this process. At times, it seems ahead of the patients' interest and certainly ahead of those seeking entry into the occupational group.

There are generally five criteria which an educator should apply to a curriculum if the opportunity is presented. These are as follows:

1. Does the curriculum meet the students' needs?
2. Does the curriculum meet the industry's needs?
3. Does the curriculum provide for upward mobility for students?
4. Is the curriculum administratively efficient so the the maximum number of students can be educated at a minimum of cost?
5. Is the curriculum flexible?

    a. Can the curriculum accept a variety of capable students with differing backgrounds?
    b. Can the student proceed at his own rate of learning rather than being tied to the "ubiquitous" average student?
    c. Does the curriculum include measurable performance criteria so that success can be ascertained when it is achieved?
    d. Does the curriculum take into account the resources of the institution, availability of staff, and students?

It is impossible to develop a presentation on the health industry without touching upon the problems associated with licensure and accreditation. It is in this area that most educators feel the greatest degree of helplessness. I again submit to this group that licensure and accreditation is in fact "double jeopardy" for the student, and as it is now practiced, probably bears little relation to success in the field. It suggests that either licensure or accreditation standards possess clear infringements upon educators' responsibility of determining how best to prepare the student for entry into an occupation. If one of these two elements were eliminated, and the remaining element concentrated its efforts in determining what the student must know and be able to do to be admitted to that occupational group, we would be a long way toward solving many problems associated with health occupation education.

A study in 1952 conducted by the Council of State Government entitled "Occupational Licensing Legislation in the States," updated and republished by the United States Department of Labor in their Manpower Research Monograph Number 11 entitled "Occupational Licensing and the Supply of Non-Professional Manpower," states the following. "Three-forths of our licensing boards in health occupations and education are composed solely of practitioners." Apparently these people seek no conflict in permitting laws designed to protect public interest to be administered by members of a group whose financial interests are involved, that licensure boards are accountable only to the courts, and possess no checks and balances on the legislative, judicial, and administrative power and authority accorded them, that few if any of the boards have obtained or retained professional expertise in testing, and fewer yet have defined any standards or required levels of expertise by the practitioners. In sum, the licensing may well have become a means by which a group may employ the government to standardize admission requirements and minimize competition within the licensed occupation, Again, I reiterate the need for the employer groups and the practitioner to establish <u>in measurable terms</u> those skills and knowledges which an entrant into the occupation must possess to assure success in that occupation and to assure the safety of the patients. Let the educator be held responsible for assisting the students gaining those skills and knowledges.

Staffing instructors in health occupations can be a real problem. The more specialized the occupation, the more critical the problem. Even when a successful practitioner can be found who is willing to leave his occupation and join a teaching staff, there is little assurance that that individual can, in fact, communicate the knowledge to others. At least in this area, we do know what needs to be done. It is obvious that for many years to come it will be necessary for the community college to draw its staff from the ranks of the practitioners. In order to assist this practitioner to become knowledgeable as an instructor, we need to develop more effective and efficient in-service training programs. Most of our institutions have some form of in-service training programs, but few have programs they are satisfied with. Here again, we might

well benefit from the experience of some of the emerging teacher education programs in the non-health industry. A number of institutions in states are seeking the diploma and associate degree graduates, providing them some additional theoretical knowledge in their occupation as well as general education and educational classes, to complete their baccalaureate degree. Most states are requiring that the individual practice his chosen occupation (internship) before the baccalaureate degree is issued.

Such a program, if adopted in the health industry, would benefit us twofold. First, it would assist us in obtaining qualified instructors; and second, it would be one avenue of upward mobility for at least some of the the practitioners.

Let me comment briefly on bio-medical engineering technology which has served as the focus for this conference. I suspect that by this time you have a fair idea of what my approach to bio-medical engineering technology would be. I have already defined what I believe to be the responsibilities of the educator. There apparently is a need for trained manpower in medical electronics. I could, with the assistance of some of our local hospital administrators and physicians, develop a program not too different, I suspect, from that being offered at Grossmont College. I could also sit down and wait until the bio-medical engineering technologists organize, publish, and lobby for their own licensure and accreditation rules and regulations, and then simply abide by them.

What I would prefer to see happen at this stage is for the employer group to define in measurable terms what the entrant into the occupation should be able to know and do for successful entry into the occupation. If I as an educator have this information available to me, I can develop an efficient and effective curriculum to meet those clearly defined knowledges and skills. And best yet, both I, the educator, and the employer group shall be able to determine the extent to which the program is successful.

In conclusion, let me recap some of the major points as I see them to this presentation. First, the entire area of health occupations had better concern itself to a far greater extent than in the past with the needs of the students and need to improve his image if it is to continue to recruit manpower. In the area of curriculum development, let the educator do it. It is what he is trained for. The educational experience of a health professional no more qualifies him to develop curriculum than enjoying general good health qualifies the educator to be a health professional. I would strongly urge that either licensure or accreditation be dropped and that the remaining bulwark of quality be updated. In the area of staffing let us simply be realistic and recognize performance as the major criteria of success. Finally, it is essential that the community colleges learn to say no to the pressures brought to bear to implement health occupation education programs, regardless of their educational feasibility. If the educational institution chooses to allocate its resources in other needed non-health occupations or in those health

occupations which do not have realistic objectives and program flexibility, we would not need to be a partner to the proliferation and inefficient practices by some occupational groups.

Community colleges, like most any other institutions, have limited resources. We must daily choose how those resources are to be allocated. Let us begin to choose those programs which do have realistic objectives and sufficient flexibility to permit us to minister to the needs of the students.

Donald L. Harbert
Dean of Career Programs
Central Piedmont Community College

THE ROLE OF JUNIOR COLLEGES IN THE EDUCATION OF HEALTH MANPOWER

I come before you not as an expert on health manpower education programs. With no answers but questions, questions which, hopefully, have solutions that you may find during this conference.

Numerous reports have established the fact that today's health industry faces an urgent shortage of allied health manpower. As early as April 1966, there existed a need for an additional 258,000 professional and technical personnel.[1] The 1970's are experiencing a 10 per cent increase (from 65 per cent in the 1960's to 75 per cent in 1970) in the number of health personnel who are being employed specifically by hospitals.[2] A prediction has estimated a need for one million additional health personnel by 1975.[3]

The need for training health personnel is not a new idea, not a new problem. As early as 1965, the Coggshall Report (published by the Association of American Medical Colleges) emphasized this need and indicated that it could <u>best</u> be met at the junior college level.

Today, this need persists but in increased proportions, and the need for training allied health personnel is <u>more</u> obvious for the following reasons:

1. Extension of the health insurance plans
2. The country's expanding and aging population
3. Increased expenditures for medical research
4. Rising health consciousness of the public
5. The increased use of technical services for diagnosis and treatment.
6. The increased complexity of our society
7. Monumental environmental problems.

In a society which has become self-examining in relation to meeting the needs of its people, the time has come to bring the people who have no jobs with the jobs who have no people. Perhaps the best way to accomplish this goal in the health industry of this nation is to research, examine, and evaluate job classifications and functions of these jobs, to locate the common requirements in order to build a core curriculum for the para-health personnel area, in an attempt to create educational programs which may assist in meeting the need of both the people and the industry.

The minority and poverty populations with vast members of high school dropouts due to multiple reasons, could hold great potential as a reservoir from which to draw students to learn the tasks and functions involved in the para-health job categories. It is conceivable that due to admission policies and other educational restrictions we are passing up some great potential.

I would hope that one of the greatest concerns of this group would be not only the addition or coodination of tracts, but also, how do we open the ball game up to those who need this type of educational opportunity?

Medical educators substantiate the need for additional health personnel and indicate a strong desire to integrate para-health education programs into the junior college. In addition, the administrators of the junior colleges themselves, wish to expand their commitment for post-secondary technical and occupational education. This would not only help alleviate the major burden of cost from the hospitals but would create an educational structure capable of producing adequate numbers of skilled personnel. Included within this educational structure would be accredited courses that would permit greater mobility through a progression of health careers.

Couldn't the basic objectives of such a program be:

1. To include an instructional phase of core para-medical courses (offered by the junior college)
2. To include clinical instruction and practice as offered by the hospital
3. To share facilities and faculties through joint appointments?

Such a program is perhaps more clearly understood if a working example is presented. In 1967, administrators from Chicago City College and Presbyterian-St. Luke's Hospital met to explore the idea of cooperatively planning and implementing a pilot program for the training of allied health personnel at the Crane campus of Chicago City College.

Out of this meeting came suggestions and eventual implementation for an instructional program which could be divided into three basic categories:

1. Clinical experience-oriented programs
2. Patient-oriented programs
3. Community-oriented programs.

Each of these areas could have three levels of training:

1. Short duration programs (about 6 months) requiring limited background
2. One-year to two-year programs requiring a higher level of skill of academic competency
3. A transfer-oriented or associate of arts degree program requiring college level ability.

A curriculum at the junior college level should be so devised as to enable the individual to advance on a continuum basis into the health field of his choice. To permit this advancement, core para-medical courses should be employed. This would preclude the academic requirements for the bio-medical technician from converging to a point where the educational opportunities at the end of two years would be at a "dead-end."

There must always be room for academic expansion and educational medical-technical innovations to meet the increased requirements of the health industry.

Couldn't the junior college more specifically play an important role when providing core courses in the allied health manpower area? Wouldn't it also be wise for the junior college to improve present or establish new medical-educational relationships by means of a consortium (network) with the four year baccalaureate colleges, universities and health industry. The purpose would be to evaluate and construct continuing programs of health educational programs and coordinate their approach, one with the other.

Couldn't the approach of medical-technical education be structured so that one can build upon it (if qualified and so desired) to eventually gain full professional status?

Doesn't the implementation of a successful program require the junior college to take a strong look at the existing health industry and to evaluate its present manpower utilization? To take a very close look at its own capabilities and relationship with not only the heatlh industry but other educational institutions.

Upon this analysis, couldn't the college then set its objectives with the thought of educating an individual to operate in circumstances more effectively than would otherwise be possible?

In conclusion, couldn't the role of the junior college, when educating for health manpower, be one of:

1. Providing an academically instructional phase of core paramedical courses such as:
   a. Introduction to health occupations
   b. Basic science concepts for allied health workers (inorganic, organic, and physiological chemistry)
   c. Basic medical concepts (anatomy, disease, etc.).

2. Providing clinical instruction and practice of approximately 12 weeks to enable the individual to choose among a variety of clinical areas, such as:
   a. Recreational therapy
   b. Inhalation therapy
   c. Tranfusion therapy
   d. Unit clerk
   e. Occupational therapy
   f. Physical therapy
   g. Corrective therapy
   h. Psychiatry
   i. Pharmacy
   j. Dental health
   k. Community health

3. Sharing facilities and faculty through joint appointment of hospital and university.

4. Encourage advanced education at all times and maintain continuous communication with health facilities personnel.

Let me say in closing there is no greater need in the health industry today than for the junior college to involve itself in the interaction with the health industry and universities to provide qualified allied health personnel with upward mobility.

Robert F. Jacobsen, Coordinator
Comprehensive Health Planning Association
of San Diego and Imperial Counties

REFERENCES

[1]"Manpower Resources in Hospitals," Summary report of survey conducted by the Bureau of Health Manpower, U.S. Public Health Service, Department of HEW and the American Hospital Association. 1966.

[2]Darby, W., and Somers, A.R.
"Medicine, Money, and Manpower--The Challenge to Professional Education. I.,The Affluent New Health Care Economy." New England Journal of Medicine 276:22, June 1, 1967.

[3]"Training of Health Services Workers, the Critical Challenge." Department of Labor and Department of HEW. Feb. 14-17, 1966.

THE ROLE OF THE JUNIOR COLLEGE IN MEDICAL TECHNOLOGY

My presentation today originally was to define the role of the junior college in bio-medical technology education. However, since the conference program was first formed, and this subject assigned to me, I have received many requests from all over the country, some as far away as Canada and Mexico, requesting information about our program. Therefore, I thought it might be of general interest to many of you here today to review the problems we orginally faced, some of the frustrations, the successes, our present position and future plans and directions.

Prior to initiating this bio-medical technology program at Grossmont College one important question had to be answered not only for myself but for the people to whom we had to sell this program idea: Why do we need a bio-medical technician?

Bio-medical electronics first interested me while I was working in the aerospace industry as an electronics engineer and was exposed to the human factors discipline where the monitoring of body signals and physiological testing in the space program was investigated. As a member of the Institute of Electronic and Electrical Engineers (IEEE) I attended several bio-medical engineering symposiums where medical and engineering people were talking to each other and trying to form a team comprised of the doctor and the engineer.

However, it seemed to me that one very important part of this doctor-engineer team, the shadow man in the middle, the person who was neglected and hardly mentioned by anyone in these talks was the bio-medical technician. To me it seemed logical that this very important member of this newly formed team should be a person educated at somewhat below the engineer's level but capable of full utilization of the complex electronic medical equipment coming upon the medical scene with ever increasing frequency.

In an attempt to discover whether others shared my belief in such a new career at the technician level I discussed this with several fellow members of the IEEE and with those in industry concerned with the design and production of medical electronic equipment. We also made use of advisory committee meetings and sat down to discuss this problem with other engineers, doctors, medical technicians and educators in the local community. The general consensus was that we needed this type of a technician and he should be produced via the junior college.

Now that this technician had been identified, and there seemed to be a present need for such a technician, we made extensive use of crystal-ball techniques and it appeared that there would be a greater need for this technician in the not too distant future. Therefore, we had to investigate several areas prior to initiating the program at Grossmont College.

Now that this attitude of initial justification for this health career program was recognized, there were several major questions that had to be explained. How could we implement a program without extensive changes; how could we identify the student; and what would our recruitment problem be; what faculty members, curriculum changes, etc., would be necessary; how much equipment would we need; what texts were available and could be obtained; would we need clinical experience for the technicians; would there be a continuing educational opportunity, or would the technician be entering only into a terminal type program? What about placement after graduation? And lastly, how could we build validity checks into our program?

With the assistance of our advisory committee we initiated our original program with existing courses that were in our catalog. In the electronics area we had a rather strong electronic instrumentation program, and it was not difficult to modify these courses to include bio-medical equipment and applications. Other courses such as anatomy-physiology, and chemistry were being taught in other health science areas and our students were integrated into these programs.

Student identification and recruitment did not present the problem that we feared it might. Once students were acquainted with the program they seemed eager to adapt to it and several students in their second year in electronics volunteered to change over to bio-medical electronics. We found it vital to know if the student had the proper temperament, capabilities and motivation to participate in this program, and each student applicant was screened and selected on the basis of adaptability, capability and the proper temperament to become involved in this new field.

The curriculum shaping was a problem to begin with and it still is being worked on. The curriculum was mostly cut-and-try to begin with. We had to do a lot of prophesying to come up with something that would not only be acceptable but vital to the doctor and this medical team. This was done with the cooperation of other faculty members, industrial manufacturers and designers of medical electronic equipment, engineers and technicians employed in the medical field. One of the warmest feelings or experiences that I've had with this program over the last few years has been the generosity and the willingness of people in all fields to cooperate in helping us put together a program that would be of value to the allied health field and our community. No new faculty members were added at the beginning of our program. We did engage in some part-time specialists to teach in special areas, and we have made use of consultants for curriculum shaping and continuing guidance as we put together this program package.

Texts and equipment used in this program were both problem areas. Texts are still practically nonexistent and many of the works available even today were obviously produced for financial rather than educational reasons. We are still searching for good texts and a lot of work must be done in this area. Equipment was not as great a problem principally

because of the excellent assistance given us by the industrial producers of such equipment, especially companies like Pewlett-Packard, Beckman and Honeywell. These firms were very generous in their help in guiding us to be selective in obtaining the most for our dollar, and this coupled with visits to local hospitals and other institutions throughout the state of California, enabled us to purchase what we feel was the most for our limited budget to date.

In a program of this type it's apparent that, as most of you I'm sure realize, there is no substitute for good on-the-job experience. Like the rose it can be called by many other names; it can be identified as clinical experience, on-the-job training, practical work, or internship, but whatever we call it we're all talking much the same thing; a student getting his hands on the equipment in his chosen field and actually operating and working with other people in an environment where he will gain first-hand experience. We were very fortunate here in San Diego by having the opportunity to have our students obtain their clinical experience at the University Hospital. University Hospital is a fairly new hospital, recently turned over to the university from the county, and with the hospital's generous acceptance of our request for aid in internship for our technicians we were able to start in February of 1969 with our first group of students obtaining their clinical experience.

This part of the project worked extremely well for several reasons. The hospital equipment was brand new as the hospital's program was expanding, and the staff at the hospital is an excellent one recently gathered from all over the United States, and we feel that we could not have done better anywhere. Since our initial placement of students for clinical experience at University Hospital we have also placed students at Doctors Hospital, a local relatively small but innovative establishment with an active teaching program in progress; and additional clinical experience is being obtained at Scripps Research Clinic which involves a different aspect of bio-medical electronics working principally in the animal lab performing research work along with doctors and engineers in a clinical environment. We are presently negotiating with three other hospitals to place our students for clinical experience and expect to have this become a reality sometime later this year.

The organizations mentioned above afford us a broad spectrum of experience and we are able to rotate the students to receive maximum clinical experience in this vital phase of their education.

Clinical experiences are very different from anything that I have ever been engaged in before, and we encountered some unforeseen problems; one of them being the legal aspects of a joint venture such as this. A formal agreement had to be worked up between that hospital and Grossmont College regarding the liability of our students and the hospital. Insurance became a problem; this was worked out and we now have a formal contract agreed upon by both institutions, and this vehicle has been in operation for the past two years, and seems to be satisfying to all concerned.

With every program identified as an occupational entry or terminal program at the community college level the question always arises, what happens if the student desires to go on and obtain advanced degrees? This is a very real question and a problem, especially in recruiting at the high school level where the faculty and the parents and many of the students are degree oriented where "degree" means nothing less than the baccalaureate degree. We feel we have a solution to this problem and I will discuss this later in my presentation.

In most careers I would imagine placement is not a problem of the educator. However, in a program such as this, which was new and really not readily identifiable by all the people who should take advantage of this technician or who would be capable of entering in this program, the problem was especially acute. This is something that worried us from the beginning: would there be jobs available for our graduates? When we started the program in 1968 there were no jobs in the area identifiable as bio-medical technician positions. In February of 1969 one technician was hired from industry to learn on the job at a local hospital. At that hospital there are now five technicians identified as bio-medical technicians, and one of these is a graduate of our program. We have had no problem placing all of our technicians either at hospitals or research clinics to date, and we envision this placement program continuing smoothly over the next several years with the anticipated growth of allied health in the San Diego area.

Validity checks are extremely important in a program of this nature. The advisory committee, our part-time faculty staff, the use of consultants, all of these are important in performing validity checks on our program and our students. After we place a student we go back to the employment agency to follow up on the performance of our graduates on the job and interview the employer and the student to see if the educational exposure he had could be improved. Some of the information we solicited and received from the students pertained to problems in the instructional phase. We have used this feedback information to improve our course of instruction at Grossmont. The students have been of invaluable assistance in helping shape our program; not only the graduating students are used for this feedback, but those undergoing their clinical experience are continually invited to critique our program and the clinical experience program at the hospital for a continued upgrading of our educational program.

In our quest for knowledge about this new mentioned health career I attended many seminars and conferences, and I was both delighted and frustrated by them. Delighted to discover the existence of information I had not been exposed to; frustrated because so many conferences seemed to have the doctor talking to the doctor, engineers exchanging data with other engineers, and the educator elucidating education with other educators.

This type of information is difficult to apply to our problem at the junior college level. We began looking around for ways to overcome these frustrations. The only way we decided we could satisfy our needs

was by planning a conference of our own. This we did by putting on a one day seminar with the local chapter of the IEEE in 1968 at Grossmont College. This was a very informal meeting with speakers working in the field of bio-medical electronics who made minimal presentations to the group. This was followed with question and answer periods.

After this one day seminar we decided that in order to do a really good job we should meet for more than one day to arrange a general conference of greater depth. We therefore hired our Special Programs Consultant, Charles Hatcher, who was experienced in this area having worked in public relations and conference managing for a good many years and was experienced in all of these areas.

As a result of the 1969 conference we found we need more specific objectives and more sharply defined problems and action recommendations. Through the generous assistance and advice of the American Association of Junior Colleges, via Kenneth Skaggs, we were able to meet in Chicago last September with persons of national reputation to discuss some of the objectives of this conference of 1970. Additionally, AAJC has aided us financially and in planning this conference. We feel we have brought together very knowledgeable people in what we hope has been a limited agenda aimed at specific actions. We think some problems will be settled and others are presently underway that the conference will definitely assist.

We believe it will be both feasible and advisable to carry on these information conferences assembling three or more disciplines as we are doing here today in what can be concurrent and contemporary meetings rather than annual affairs. These conferences should be carried out as regional conferences at various times of the year, and could be sponsored perhaps with Grossmont advisory participation and the American Association of Junior Colleges guidance by regional groups who could then assure themselves of constant and consurrent information and continual checking on the progress being made in other regions.

Because an emergent health career programs such as bio-medical technology would necessarily be limited in job placement, especially at the beginning, there has to be some general agreement in the local area to avoid duplication of effort by the community colleges. Fortunately in San Diego and Imperial Counties an agreement had been worked out with the seven community colleges and our vocational-technical dean, Al Paul, is the chairman of the San Diego Area Community Colleges' Vocational Educational Planning Committee. His committee solved this problem by assigning the vocational programs to individual colleges to avoid duplication of effort and this committee, including representatives from each of the community colleges in the area, has been successful in implementing an inter-college cooperative agreement which eliminates any chance of redundancy in program initiation.

This is extremely important to us in putting on an extensive and expensive program such as bio-medical technology as it enables Grossmont to recruit students in the entire San Diego County--Imperial County areas with no problem of interdistrict transfer. Additionally, this kind

of planning enables us to present a united effort in applying for funds from federal or state agencies, and enables us to work with other groups such as the Comprehensive Health Planning Association and the Regional Medical Program personnel locally.

Leaving the area of the associate degree program for the present we find we have a rather pressing problem coming up at an alarming rate. This is in the area of teacher education. What shall we do at the junior college level to obtain the services of competent teachers in this field? With the cooperation of the Dean of the Department of Education at San Diego State College, Manfred Schrupp, and his able assistant, Doris Meek, who is responsible for the junior college teacher program; and Michael Shimkin, of the University of California at San Diego; and the Regional Medical Program, we are presently putting together a package which will enable the graduate of our program, if he so desires, to progress toward the baccalaureate and the master's degree to enter the teaching field. This program is just beginning but it has been received well by all concerned, and we hope to implement it swiftly in the near future. At some later date we also would like to shape a program for the technician who wishes to progress to the level of the technologist, which is normally at the baccalaureate level, and hope that this would open doors for him in the supervisory area at large hospitals who would be capable of employing such a person.

Along the way in developing this program we have discovered that we have reached the area of specialization in some bio-medical technology fields. Rather than developing a general bio-medical technician with a broad background in medicine and medical equipment we discovered that we are going to need technicians in other areas who will be specialists. Some of these will work as the bio-medical electronics technician in body monitoring, in the EGG, EMG and ECG signal recording, others may be utilized in the cardio-pulmonary and/or cardiac catheterization laboratories. Still other technicians will be working in the clinical research areas which will include the use of computers, and a fourth area is that of the calibration, standards and repair-type technician. This last technician will be extremely important to the larger hospitals to perform periodic repairs in greater depth than will be possible by the ordinary technician. Of necessity these repairs must be done by competent personnel to reduce the hazard of modification or misuse of equipment and the ever present shock hazard to the hospitals. Smaller hospitals of course would not be able to afford this expensive staffing, but eventually as the use of the bio-medical equipment becomes widespread there will have to be some specialist validating equipment, calibrating it periodically, and making the repairs on the site through the use of a local repair agency or perhaps a joint venture with the larger hospitals.

Exciting and interesting to us also is the cooperation we have received from the United States Navy Hospital Corps School at Balboa Naval Hospital in San Diego. They are working with us in a joint venture to help them obtain associate degrees for graduates of the various Corpsman Schools, and to obtain college credits for both the military school and the on-the-job experience that they have been exposed to in the field.

The general education requirements for these personnel will be satisfied by the Grossmont College faculty teaching at either the hospital or Grossmont campus to enable the students to obtain enough general education courses to complete their requirements for the associate degree.

On the other side of the coin a new dimension was added when we discovered that the Navy might be willing to allow our students to complete their general education requirements at Grossmont College, and then sit in for their practical experience at the Naval Hospital in various technical programs. These could be in the cardio-pulmonary, the pharmacist, the inhalation therapist or other areas that are firmly established by the Navy in their hospital corps program. This idea is being worked on at present and we hope to have more information for you in implementing this program later on in 1970.

Finally this brings me to the title of my original query: "What is the role of the junior college in the technical-medical careers area?" Some of the tasks of the junior college, I believe, are:

1. We must assume prime responsibility for designing, organizing and implementing complete medical health technician programs at the community college. This would include curriculum shaping, recruitment of teachers and students, course and program accreditation, and integration of practical experience and academic-type exposures not found on the college campus.

2. I feel that we must agree among each other to try to group courses and programs under the various medical-technical field to establish some generic programs which could have a common core and enable the student to specialize in his third or fourth semester in the program. For instance, the bio-medical electronics technician could be split into some areas, one of them being a body monitoring specialization as mentioned previously the EEG, EMG and ECG-type technician; another bio-medical technician in the cardio-pulmonary area, one in the bio-medical technician in the cardiac catheterization lab area; and then maybe a fourth in the standards and repair specialization group, and lastly the technician in the reasearch area. Later on we may want to consider other areas such as radiology and computer technology, medical records technician which would include the use of computers in the programming and operations for maintaining medical records.

3. We must establish relevant accreditation programs with the cooperation of the American Association of Junior Colleges, The American Medical Association, the American Hospital Association, and empower competent accrediting agencies, such as the Engineers Council on Professional Development, ECPD, to provide professional accreditation to associate degree programs across the nation in the junior colleges and the technical institutes. This has to be done very quickly to avoid the splintering and proliferation of the various accreditation programs attempting to take over some of these newly merging careers in the medical health field.

I feel personally that registration, licensing, certification unionization, can all be avoided if we have a competent accrediting agency with the powers of quality control and validity worked out as a joint venture by the agencies mentioned above, and this approach would be much more feasible, economical and palatable to the employer than any other type of recognition program that has appeared to date.

4. We must also cooperate with the four-year colleges and the universities in establishing baccalaureate and advanced degree programs. This is absolutely necessary to furnish the teaching staff so urgently needed in the 1970's at the junior college level. Additionally we must furnish teachers for teaching at the higher levels, the four-year college degree level; but this is in the domain of the universities to produce the doctorate and advanced degrees required to teach at these levels. In any event the junior college must initiate the action to solicit the cooperation of the various higher level educational institutions in establishing a joint venture of this type.

5. We must utilize definite innovative methods in the area of accepting military school education and experience in awarding the associate degrees. In other words, we must be "risk-oriented."

6. Probably the most vital area of concern to the junior college is in the area of recruitment. There are several approaches to this. We feel we have an excellent working approach here at Grossmont with the cooperation of the Women's Auxiliary of the American Medical Association local chapter, and because we in the junior college are required to have first contact with students in the allied health technical programs, we must reach out to the high school, the junior high school, the returning veterans, the ghettos, or wherever we can excite people into enrolling into our programs, not only large numbers but competent, motivated people through appropriate selection mechanisms.

In conclusion, I would like to point out the fact that my talk today may not have solved very many problems. A lot of what I have said may be old hat to many of you sitting here in the audience. I hope we can continue to have cooperation at the community college level across the nation in establishing a systems approach to the education of our bio-medical technicians. There may be other areas that we should look into later on. I would heartily endorse the cooperation of all of us interested in this area of education in exchanging information and by cooperating to make the junior college a very valuable part of medical education in the technical areas. The jealous guarding of all the

individual groups in forming societies, unions, and certification, licensures at different levels throughout the nation has got to cease if we ever intend to have any unified approach to medicine and health care in the United States, and health care at a price that the consumer can afford. It is not an impossible task and may be made relatively easy if we just agree that this is what we want to do at the educational level before we have these other groups solidified and set up artificial barriers difficult to surmount.

Then and only then will we do something of great value for the eventual consumer who is the patient; and incidently, might very well be any one of us sitting here today.

Willard Dellegar, Head
Bio-Medical Engineering Program
Grossmont College

WHERE DO WE GO FROM HERE IN TECHNICAL EDUCATION?

The community college is dedicated to the meeting of the educational needs of the entire community. To do this, it frequently divides its curriculum into five basic parts: the college and university parallel program, the general curriculum, developmental programs, community service, and career or technical programs.

Although the entire concept of the community college has experienced widespread acceptance and phenomenal growth, no area has developed faster in recent years in the community college than that of career or technical education. With this rapid growth many concurrent problems and challenges have presented themselves. Several of these seem especially applicable to the subject of our workshop this afternoon.

The Problem of Cost

One very real problem involves the disproportionate cost of technical education. The cost per credit hour in my institution, for example, for nursing is $51.58; for dental hygiene, $48.47; for clinical laboratory technology and radiological technology, about $32.00; while the credit hour cost in the social sciences and humanities is less than $16.00. In addition, the original capital outlay for equipment in technical programs may be very high. Equipment for our dental hygiene clinic was in excess of $100,000. Also professional personnel, such as dentists, in these programs may be very costly.

Because of these relatively high costs, the technical programs necessarily find themselves in competition with other programs in the college for funds. I personally feel that the product turned out by the technical program is well worth the cost and, in fact, is much more economical than any other way in which this same technician could be trained. Still--there is a limited number of budget dollars and it would behoove us to get as much for our dollar in technical education as we possibly can.

The Core Curriculum

One way to do this would be in developing core curricula to the fullest. Core curricula are one of the most discussed and one of the least practiced concepts in modern education. In the dental auxiliaries we are working toward making at least the first semester of dental assisting and dental hygiene interchangeable. Three courses, at present, are common to both programs: Roentgenology, dental materials, and operative procedures. It is our goal to develop a curriculum so that students from our own dental assisting, as well as from other dental assisting programs may transfer into dental hygiene with a minimum loss of credit. This would produce a saving in both time and money.

We have been able in two areas, hotel, motel, and restaurant management and institutional food service management, to combine the entire first year so that a student doesn't have to decide which program he wishes to pursue until he starts the second year.

Again in the area of nursing and the nurses aide, it would seem that a nurses aide with many years of experience should receive some credit for her experience and not have to start all over again. In fact, four of our faculty will spend next summer on an extended time project exploring the entire nursing curriculum to find ways to make the associate degree program more efficient.

They are asking such questions as: Why does a student have to begin nursing in September? Why can't we start a new class each semester? Or better still, why can't a student begin the new program at any time and finish it any time that he completes the required curriculum? Some could undoubtedly complete the work in much less time than the required two years. Courses in technical mathematics, technical physics, communications, human relations, and chemistry of human function, are common to many of our technical programs, but this represents just a beginning.

The Problem of Accreditation

Although core curricula or core courses are economical from the standpoint of both time and money, they run into a major obstacle in the form of accreditation requirements imposed by the various national accrediting agencies for the career programs. In one area, dental hygiene, the accrediting team very strongly recommended that at least twenty-five credit hours of the two-year curriculum be of the "transfer" variety so that a student might move easily into a four-year baccalaureate program with a minimum loss of credit. This means that the students must take general chemistry rather than communications, American civilization instead of human relations and so on.

The latter courses, in each instance, were designed to specifically meet the need of the student in a two-year, terminal, career program. Similar problems are experienced with accrediting agencies in many of the other technical fields. The members of the accrediting teams are still strongly indoctrinated in the concept that the junior college is a transfer institution into four-year or graduate programs and find it difficult to understand the two-year terminal concept for technical education.

The allied health career programs are represented by a complex system of organizations concerned with accreditation, registry, training, and financing. Federal grants in some instances are not available unless a program is accredited by the appropriate accrediting agency. Lack of cooperation and communication between these agencies could seriously handicap the development and smooth operation of a number of technical training programs.

In one area representing the clinical laboratory technologies, there are at least three agencies for registry, each competing with the others. An emerging clinical laboratory program is at a loss to know which is the appropriate accrediting agency: ASCP (American Society of Clinical Pathologists); AMT (American Medical Technologists); or RMT (Registry of Medical Technologists). In radiological technology, there is the American Registry of Radiologic Technologists and the Association

of Radiation Technologists.

Cost again becomes a major problem. In one area alone, nursing, the membership fee for the "Council of Associate Degree Programs" of the NLN has increased from $285 per year in 1969 to $385 in 1970 and in 1972 will be $575. Multiply this by the dozens of technical programs in many community colleges and compound it by a multi-campus situation and the cost could become prohibitive.

Liaison with the Senior College or University

Cooperation between the senior colleges and the junior colleges can be of immeasurable value in many ways including the conservation of time, effort, and money. In November the Vice Chancellors' for Medical Affairs at St. Louis University and Washington University invited the junior college district to participate in a two day retreat to plan ways which the three institutions could best cooperate in the entire area of allied health programs.

Out of this retreat a permanent committee was formed with the cooperation of the Bi-State Regional Medical Program, to plan and initiate ways in which all of the institutions in the greater St. Louis area might cooperate. The committee was enlarged to include representatives from Missouri University, Southern Illinois University, Belleville, and East St. Louis Junior Colleges, as well as the Junior College District of St. Louis and St. Louis University, and a representative of the Greater St. Louis Medical Society.

Areas that have been designated for mutual cooperation include:

1. Maintain continuing survey information on health manpower needs in the region
2. Maintain a current registry of allied health education programs being offered in the area
3. Maintain a central data bank on standards and requirements for approval of allied health manpower programs
4. Maintain a central data bank on funding mechanisms--federal, state, and local
5. Coordinate curricular offerings with regional allied health manpower needs.
6. Maximize vertical and horizontal mobility within and among programs
7. Expedite faculty and/or student exchange to make maximum use of faculty manpower
8. Coordinate use of available clinical training facilities
9. Develop common definitions of general education requirements in core curriculum
10. Design and coordinate student recruitment program
11. Respond to requests for consultation
12. React to and recommend approaches to current disparities in state regulations affecting allied health manpower in Missouri and Illinois.

Selection and Retention of Students for Career Programs

Millions of dollars are lost each year in the form of drop-outs from the various technical programs as students find that they aren't interested in a particular program or that they aren't suited or qualified for that particular program. In one program alone, out of twenty-three who enrolled in the program, only three graduated. This kind of mismatch between the student and curricula causes student unrest and discouragement and is costly to all concerned.

A very extensive and exhaustive study needs to be made to develop methods of measuring aptitude and predicting success in courses, curricula, and in later employment. The information secured from such a study, of course, would necessarily need to be accompanied by a very effective counseling program. Some say every student should have the right to enter any curricula he chooses and fail, if he is not adapted to that particular field. This certainly isn't a very efficient way to spend the limited budget in a career program, especially when there may be a waiting list of qualified students, and in an inner city situtation the thing the student needs least is "another failure."

Many of our junior colleges instead of becoming true community colleges attempt to become "junior universities". They follow the same traditional methods that have been practiced in education for generations, even in technical education. An instructor in nursing, for example, uses the same teaching procedure that she used or was taught in the diploma program or the baccalaureate program.

Other community colleges attempt to be innovative. Why shouldn't career courses be "open-ended" with no fixed time reference? Why can't much of the material be available on audio-tapes, video-tapes, cartridge projectors, and the like? Might it not be better to abolish a grading system and indicate just pass, fail, or withdraw? A student would continue in a given subject until he mastered 80 to 85 per cent of the work. A student might be permitted to enroll in a class as many times as he desired, without penalty, and graduate when he completed all courses.

Should we eliminate the concept of course prerequisites as being "absolute"? We might find with a great shock that some of the courses we considered to be absolute prerequisites are really not prerequisites at all. In fact the prerequisites may at times screen out the very student who is best suited to a two-year, terminal, technical career. In engineering technology, for example, we might require Calculus I and Calculus II. We screen out the student who can't pass them and the one who finds that he can pass them frequently elects to continue on to a four-year degree leaving us with few two-year terminal graduates.

It might be well to offer an introductory course, possibly at night, in a given curriculum, which the student might take, without penalty, to determine his interest and aptitude for a given curriculum. Should a

student be limited to a certain course load just because this has always been considered a maximum load or should we allow him to accelerate with a heavy load if he feels he can do it? These and many other subjects might be profitably explored by an exhaustive study into "Selection and Retention" into the technical programs.

Conclusion

The purpose of our workshop today is to discuss the many mutual areas of interest that we have experienced as educators concerned with technical or health career programs. The topics presented above are in no way intended to be a complete list of areas of concern nor should they limit the scope of our discussion in any way. It is hoped that they will serve as a springboard from which we can move into areas of the greatest interest to you.

Oliver Duggins, Chairman
Life Services Department
Forest Park Community College

WHERE DO WE GO FROM HERE:

AS THE PRESIDENT SEES IT

As a group of educators and professionals in the health services, we have a common interest. That interest has been expressed many times during this meeting. As a president I have the same interests; however, I have another responsibility which I must stress. That responsibility is centered around finances. I am responsible for keeping the community college within its budgetary constraints. I know I overuse the word "money." Someone has to keep the instructional program in total perspective--the buck stops with the chief administrator. There's at least one other word in the vocabulary of most presidents--instruction. Without instruction, which is provided by dedicated staff, there would be no need for administrators, admission personnel, or placement personnel.

This has been an excellent meeting--a challenge to us to investigate current programs; to implement new programs. We discuss our problems and suggest solutions. If we leave here and do not implement new programs or improve existing ones, out attendance has been minimized; especially so, when we consider that the community college movement is action oriented.

We must meet challenges--we must rise to new heights--we must assume leadership roles--we must meet manpower needs. How?

Many of us are thinking of implementing bio-medical technology programs. Our presence testifies to this. Please don't put in a program because another community college has the program. Don't do it just to be "keeping up with the Joneses."

First, conduct a survey of manpower needs--survey students (I suggest students be surveyed as to their interests, because if students are not interested in an occupation we better think twice before implementing the occupational program at a community college)--also survey hospitals and manufacturers of bio-medical equipment.

Survey placement possibilities (potential remuneration). Should we encourage a person to complete an occupational program of one to two years duration to earn less money than the person could have earned if he had not received the training? We should review remuneration, especially if job mobility is limited by a "dead-end job."

Use advisory committees. Have representatives from health institutions and agencies, manufacturers, and the institutions and businesses served by the personnel in the occupational program to be implemented to serve on the committee. Advisory committees will help us in developing our course of study and curriculum, with the selection of modern equipment, with clinical facilities and clinical experiences, and with the qualifications desired in our instructor. We need the close contact and help of the people who are on the day-to-day firing line in the health occupations.

As educators we use a jargon which includes FTE's, ratios, and contract hours. Costs are very important. No one is more aware of costs than the president. He is continually fighting for more financial support. The public wants more efficient education for no increase in cost. We need to find additional sources of revenue. We need more money from local sources, from state sources, and from federal sources. The president and the governing board of the community college are faced with many requests for funds, but funds are limited. Therefore, we must find new ways to educate more students more efficiently and more effectively.

One solution is the core curricula. For example, students needing a course in anatomy could be scheduled in one section. At present we are scheduling a section of anatomy for dental assistants; this section may discuss anatomy from the shoulders up. We may have another section for nurse aides. We may offer a section for registered nurses receiving the associate degree. A fourth section in anatomy may be offered for physical education majors. A small college could not financially provide for four sections of anatomy with an enrollment of three, six, or nine students in each section. The ratio of student to instructor in each section must be a more efficient ratio than this. Can we achieve this objective through a basic core curriculum where anatomy is taught as anatomy and we enroll transfer students, students who are pursuing the dental assistant program or other occupational programs; i.e. the nurse aide program or the associate degree registered nurse program? Physical education majors would also be enrolled in this one section of anatomy. However, to fulfill the needs of students who differ in interests, capabilities, motivations, and achievements, we may have to teach anatomy by using modern educational media (this has been previously mentioned in our meeting) in order to put instruction on a more individualized basis. We must start some of our health education programs by offering core programs which can be indentical for various courses where we can combine larger numbers of students.

We must consider space and space utilization. Equipment is very expensive; therefore, equipment utilization must be critically analyzed as we plan new programs and review existing ones.

The quality of a program in health occupations is vital to its success. Again, may I emphasize placement. A student may complete an associate degree in history and transfer to a baccalaureate degree-granting institution. The behavior changes in the student are very difficult to measure. We assume that he has acquired knowledge and that behavior changes have resulted. On the other hand, a student completes the associate degree registered nurse program; and, let us assume, that student is not employable. The instruction program--associate degree nursing--is under the microscope. One criterion upon which to evaluate an occupational program is placement and success on the job. If persons who complete occupational programs are not employable, we must question the quality of our programs. Many times quality is equated with licensure and accreditation. May I urge that the process of accreditation,

certification, or licensure be minimized. We must consider the involvement of institutional manpower on the part of the president, deans, divisional directors, and instructors, in addition to the incidental expenses which are incurred by accreditation committee visits. The time and cost involved with accreditation of ten to fifteen occupational programs in an institution is very great indeed; and when we consider certain institutions are multi-campus institutions, the costs are astronomical. We must minimize these costs and prevent this drain upon the manpower of the college.

After hearing the implications of the budgetary constraints which must govern implementing new programs and the questions regarding core curriculum and quality of programs, do you still want to meet the challenges which are confronting us in the health occupation field--do you still wish to implement the program?

Another vital topic to be considered as we answer the question, "Where do we go from here?" is the recruitment and counseling. The "open-door" community college accepts persons of all ages, all walks of life, individuals with varied aspirations, achievements, motivations, and capabilities. The counseling staff and each master instructor, who serves as an advisor, assists the student in determining what he wants to do to earn a livelihood. Interests, capabilities, drives, and achievements are scattered on the spectrum--from one end to the other; and if interests are at one end and drives on the other, something must be done to make them more compatible. Or if capabilities are at one extreme on the sprectrum and achievements at the other, we again must get them closer together. The college must be based on an outstanding counseling program.

In recruitment, may I suggest that we make a specific effort to recruit medical corpsmen? Also, that each institution provide for a challenge of courses or an advanced standing examination which will enable the college to measure the knowledge these individuals have acquired and the skills they have developed, and that they be given credit for knowledge and skills so that they may proceed from their present achievements rather than be compelled to go back and complete an entire course when they already have mastered much of the knowledge and skill demanded by the course. How do we evaluate or measure when we permit challenge of courses? By commercially produced measuring devices, if they are available; or by college produced devices, which are produced by the staff members of the institution? Any registered nurse with a master's degree should be capable of evaluating the skills of a person who has had previous experience in the nursing field. Credit for skills and knowledge obtained elsewhere should be given to the student upon his enrollment in the program. He should not be asked to repeat. Repetition of courses already mastered is time consuming and dulls interest and motivation. All programs and courses should be eligible for a challenge examination, including those in health occupation fields.

May I mention a project called MEMO which is being sponsored by the American Association of Junior Colleges. It means more education, more opportunity. This program is especially aimed at informing ex-servicemen of the possibilities in higher education and specifically at the community college. Each community college is notified when a returning veteran is about to be discharged from service; his name and address is provided the college as well as his residential address. The community colleges are urged to get in touch with the returning veterans and inform them of educational opportunities in the community college and what the community college can do to assist them in preparing for an occupation in civilian life. Project Transition also helps returning servicemen adjust from military life to civilian life.

Where do we go from here? We can answer this in part by discussing the retention of students. Again I must stress counseling. Remuneration is also vital. When we are planning occupational programs, we should avoid jobs with no chance of advancement because jobs must be challenging to individuals as well as pay a living wage.

We can increase the retention of students by citing specific cases where individuals have completed programs at the community college and emphasize what that person is currently doing and the salary he is receiving This will serve as an example for students who are contemplating entering the occupation. If we can cite some student who completed the program just the previous year and the person is now employed in a certain health institution and receiving a specific wage, this information will be very useful in informing potential students and retaining currently enrolled students. Another image which will be an attraction to potential students is the male image in the health occupations, especially in the associate degree nursing program. I think the suggestion that has been made is an excellent one.

If I have not challenged you in any way, may I leave one thought with you; and if you remember nothing else, this one concept, if retained, is a vital one indeed. Learning is lifelong--we learn from the cradle to the grave; we continually get on and off the escalator of learning and education throughout life; we learn every day, in formalized settings such as a classroom, in semi-formal settings such as this conference, and informal settings such as learning from TV commercials. We may learn which kind of coffee to purchase or which kind not to purchase. As community college instructors and administrators we should stress that as each student leaves the institution, he should return to an educational institution when the need arises for upgrade training, for retraining, or to keep up with the latest technological advances. He should return when promotion is in the offing. The student must be impressed with the need to refuel continuously throughout life, because his educational supply tanks will soon be exhausted without this continuous refueling. If we do no more that impart the importance of getting on and off the escalator of learning as the need arises throughout life, we have accomplished a great deal in the current and future progess of our students.

I must again stress placement. Placement is the one area where community colleges throughout the United States have not scratched the surface. Each instructor should supplement a centralized placement program.

Under the direction of able leadership, a placement office should be provided where one can go to obtain information such as the following: Joe Blow is working at X industry, business, or health agency in a leadership role and is earning Y amount annually; or that Miss X is a nurse educator today, she has her master's degree from Y institution and ten years ago she completed the associate degree registered nursing program at the community college, and that her progress is outstanding. This is the type of information we must have on every person who completes an occupational program at a community college.

The challenge to us is to implement new programs or to improve existing ones. If we go home and forget the stimulating messages that have been provided during this conference by so many able speakers, our meeting expenses are not prudent expenditures. The community college movement is action oriented--action speaks louder than words. Let's go home and do something as a result of this meeting. Let's relate to a dynamic community college which had this saying, "If you can't push, pull--if you can't pull, get out of the way because we are coming through."

Leland B. Luchsinger, President
Community College
Denver, Colorado

WHERE DO WE GO FROM HERE?

I am sure that, by now, you have seen that there is not only a current but a much greater, as yet unmet, need for health manpower, for health facilities, for methods of delivering health care and for improvement in our means of bio-medical testing and monitoring. I am sure that some of the previous speakers have presented many statistics in support of these problems. However, I have grave doubts about the validity of these statistics. In fact, because of various factors I will mention, I doubt that it is possible to achieve, at this time, valid statistics. It is difficult to determine whether the shortage is actually real or, to a great extent, imaginary. California, of course, does not have the great shortage of health manpower seen in other parts of the country. Even though California is a debtor state as far as adequate numbers of health manpower, our climate, our expanding economy, and the people, particularly the wives who are waiting here until their husbands leave the service, have given us an adequate backlog of health manpower at the expense of the rest of the country. The present statistics were developed on the basis of required numbers of health manpower per hundred thousand under medical care delivery systems in operation today or, actually, in operation five to ten years ago. They also take into consideration the attrition rate...that is, the number of people leaving the health manpower field because of financial and other reasons; in effect, either today or several years ago. They project the number of health manpower we are training at the present time and compare it with the projected rate of population increase.

In reality, this fails to take into consideration several facts. On one side is the fact that, today, we are only taking care of 20 per cent of the population. This is because 80 per cent of the population receives no medical care whatsoever for a number of reasons, only a portion of which is economic. Despite this lack of medical care, we know that the average individual from 40 to 65 years of age has 2.1 chronic diseases and, over 65, the individual average is 4 chronic diseases per person of which at least 50 per cent are curable with present day diagnostic and therapeutic techniques, if they would only seek medical care.

On the other side, consideration has not been given to the fact that we are already effecting more efficient delivery of health care, including automation of many procedures, such as the monitoring of vital signs, the automation of laboratory procedures and the like. There is room for great progress in this field, and I believe that it will be forthcoming fairly rapidly. Also, we are beginning to make different uses of existing personnel, which results in more efficient and better patient care, and we are quite hopeful of keeping a much greater percentage of personnel in the health professions and occupations once they are trained.

Within two years, health care will be the number one industry in the United States. This presents a tremendous challenge. It becomes apparent that it will take team work with all the individuals in the health care field working side by side and talking to each other to

adequately handle the health care problem. The question, of course, comes up, "What is the health care team?" The definition given by Dr. Donald Williams, Division of Continuing Education, Health Science Center of the University of British Columbia, defines a health science team as "A group of health professionals with their respective associated technologists, technicians, and other essential personnel, whose overall goals are the promotion of help, the prevention of disease, the diagnosis and treatment of illness, and the alleviation of suffering, who, by cooperation, coordination, and integration of effort provide health care embracing the sum total of relevant knowledge, skill and technology produced by all the sciences and as applicable by other learned professions, and who recognize every healthy or apparently-well person, each patient, the family, and the community as integral participants in the process of providing this care."

Today, there are no new problems. However, the state-of-the-art has progressed to a point where not only can problems be better and more clearly defined, but we can hope for solutions to most of these. This plus the ease of the world-wide communications with T.V., radio, satellite, etc., give an urgency that has never before been present. Unfortunately, the urgency of these problems comes at a time when we have suddenly realized that there is a limit to our resources and, if we are to accomplish anything worthwhile, we must establish priorities. While science has given us much help, and its contributions, such as the space program, have stimulated both the imagination and demands of the public, it has also added to the confusion by the fact that they are presenting us with about 500 new scientific facts a day, both good and bad. In fact, we have discovered more scientific facts in the last thirty years that we have in all the rest of time, and we will discover more in the next five years than we have in the last 500. Ninety per cent of all scientists who have ever lived are still alive today.

In our search for more efficient and perhaps more scientific solutions to the health care problems and the delivery of health care, we must not sacrifice the doctor-patient relationship, for this is what develops the patient's confidence in the doctor, and without that confidence, the patient is not apt to follow the therapeutic regimen outlined by his doctor. I can be the best doctor in the world, but if the patient does not have confidence in me, I am not the doctor for that patient. This doctor-patient relationship must go beyond the specific problem at hand, for the doctor must not just be concerned with a specific problem but with the patient's welfare as a whole and with the patient as an individual.

I would like to dwell briefly on five areas in which I think change that is taking place should take place and will result in better and more efficient health care, with better utilization of health manpower. These deal with: First, licensure, certification and registry; second,

with the development of core curricula for the various health professions and occupations; third, with the increasing use of nurses as specialists; fourth, with continuing education for all health personnel and fifth, group practice and multiphasic screening.

Health professional or vocational licensure is the governmental process of granting individuals permission to engage in a profession or technical vocation in a health field, It provides for the enforcement of minimal legislative standards for entering and remaining in a particular profession or vocation and may prohibit certain activities. Changes in these requirements or permissible activities often may require legislative action. Each board of licensure tends to be semi-autonomous with little inter-reaction with other boards in associated fields.

The original purpose of such licensure was to protect the public against uneducated and unethical practitioners. Unfortunately, this has not remained the purpose of all health licensure laws. Today, some of these now serve mainly to give legal recognition to certain health professions, vocations, and cults. Other laws act as restraints of trade by preventing or restricting training of other groups in certain modalities. In fact, statutes governing delegation of tasks to allied health personnel often are not based upon the realities of the delivery of modern medical care and may be restrictive, ambiguous, or unrelated to accepted custom and usage. Furthermore, they make no provision for the evaluation of continuing competence of those licensed, nor do they provide for continuing education.

In this day of rapid change, in technical knowledge, in innovations in education, in the use of health manpower, and in the delivery of health care, plus the development of new health professions and vocations, the rigid licensure laws provide barriers to the implementation of these changes and innovations and to the efficient delivery and improving of excellence of health care. With the ever increasing need for health care, this problem is further compounded, Particularly critical is the lack of provision for a mechanism for the rapid development of uniform educational requirements for new professions or vocations or more efficient utilization of existing health personnel.

In contrast to board licensure, certification in the health professions and vocations, which is the nongovernmental setting of standards and qualifications promulgated by professional groups, usually requires no more than minimal standards and strives to promote excellence. Certification standards can be more readily up-graded and often require periodic review of maintenance of proficiency and participation in continuing education. Ethical and moral standards also can be on a positive, rather than a negative basis, as are those promulgated by legislation.

Another mechanism which probably should be combined with the use of certification and licensure is registry of proficiency for health manpower as proposed by Mr. Ralph C. Kuhli, Director, Department of Allied

Medical Professions and Services for the American Medical Association. The registry would be the entire form of certification of certain health occupations and, for others, it would be a form signifying a given amount of training experience in a certain health occupation, somewhat below the level of certification. As Mr. Kuhli envisions it, registries would work to develop nationally accepted lists of tasks for allied health occupations and to develop examinations which would measure any applicant's competency to perform these tasks. Thus, the registries could determine the proficiency of anyone--a discharged military medical corpsman; the graduate of a foreign school; a graduate of a school which is not currently accredited by the AMA, including proprietary schools; a person with long experience, etc. Registries could also certify, without further examination, all graduates of AMA accredited educational programs. This combination of the use of registration, certification and, in certain professions, licensure would be a great help to the individual in the health field who wishes to move upward and would likewise be a great help to the employer, who would have a readily available standard to inform him of the proficiencies in training any proposed employee. This would stimulate innovation and help solve manpower problems. Mr. Kuhli also feels that it would help minimize over-education.

It is felt that we need an alternative to the present setup, one which would provide the protection of the public from incompetent or misguided practitioners, in providing the protection of licensure, the higher standards of certification, plus some means for coordination. There should be a mechanism for adapting to new utilization of health professionals and technicians, as well as the rapid development of standards of education and performance for new health profession and occupations. This could be achieved by the health council, which has given broad responsibility and regulatory powers by legislature, with periodic assessment of their performance in this field. This health council would be made up of individuals from various health occupations and professions and, in turn, would designate peer groups, plus indicate educators or other personnel to act as certifying bodies for each particular profession or occupation. The actual establishment of ethical standards would be by the certifying body but would have to be acceptable to the overall health council. The certifying body could initiate additional centers for the training of personnel in new tasks or might be requested to do this by the health council. The health council could direct two certifying boards to work together on mutual problems.

Whenever it became apparent to the health council that there were new developments requiring new health professions and occupations, it could appoint appropriate individuals in the new profession or occupation, in closely allied professions or occupations, plus appropriate educators and a representative of the profession, which will be directing the new profession or occupation's function, to act as an initial certifying board to establish standards for the profession or occupation. This initial board would gradually be replaced by a peer group, as they were educated and gained experience in their profession or occupation. In a similar manner, the health council could direct the abolishment of a certifying board, where the task performed by that profession or occupation has been taken over entirely by closely allied professions or occupations, or is no longer needed.

In certain health professions, both licensure and certification may be warranted. Thus, licensure would be proof of completion of a prescribed program of training with the acquiring of proficiency in the field as determined by examination plus the meeting of certain moral and ethical standards. Certification would designate further proficiencies and the maintenance of proficiencies by continuing experience or education. In some of the health occupations, there probably will be several levels of certification with the area covered by a single certifying board. An example of this would be certification of intensive care nurse, emergency room nurse, etc.

One of the great sources of loss of health manpower has been the inability of personnel to move either upward or laterally within the health professions without time consuming repetition of considerable study. Those institutions responsible for education of health professionals and technicians have been either unable or unwilling to solve this problem. A council of health standards and licensure, such as proposed above, could give great impetus and direction to the solution of this problem.

Core Curricula

Most of the other health professions and occupations were created by physicians. Many of the occupations or professions are reluctant to admit this, but this is actually the case, and the physician created them because he needed them. In 1910, there were 40 allied health personnel for each 100 doctors of medicine. Today, there are 1400 for each 100 doctors of medicine. Originally, there was a pyramid approach to the health team with the doctor being at the top. As you can see, if this were still adopted today, the tail would be wagging the dog, and we must adopt a side-to-side approach in the health team, all of us working together toward a common problem. Many of these allied health personnel have basic similarities in their background needs. The utilization of health professionals and technicians is constantly changing.

One of the great costs in health care today is the fact that we put too many people through expensive training in the profession or occupation, only to have them work a short period of time and then leave the field because of economic hardship, lack of intellectual stimulation, or the fact that there is no longer a great demand for someone with their specific skills. It becomes readily apparent that if there were some way an individual could gain additional training, which would result in increased income, increased intellectual stimulation, or a greater demand for their services, it would be of great advantage in increasing the available health manpower. A core curricula is a manner in which this can be achieved. In addition, it will give many of these occupations and professions a better understanding of each other's function. Thus, the aid could aspire, with further training, to become a L.V.N.; the L.V.N., with further training, could become an R.N., without repetition of work which was required for her to become an R.N. The R.N., with further training, could be a graduate degree nurse, etc. The same thing would apply toward utilization of corpsmen, who could start out as an operating room technician, eventually becoming a physician's assistant.

Nursing

I believe that there is going to be a need for training an increasing number of nurses, a much greater need perhaps than the need for training greater numbers of doctors, and I believe that, in such training, we will solve many of our health manpower needs. Certainly, in many ways, it would be more efficient when you realize that the basic training of a nurse required a period of two to four years as compared to the seven to thirteen years to train a physician. There is a reason why I have selected the nurse for this emphasis, and it is that, outside of the physician, she is the only person in the health manpower field that has been trained to deal with the patient as a whole. Her approach is a humanistic one. It deals not just with the specific problem that brings the patient to the hospital, but it deals with the relation of that problem to the patient as an individual. All of the other allied health professions and occupations tend to deal with a specific problem rather than an entity.

Now I know that social workers will take exception to this as they, too, tend to deal with the patient's problem as related to society, rather than himself, and they do not have to know the patient's background. Certainly a nurse is not ready to specialize when she has completed her basic training but, after a period of practice, say five years, in active, acute situations, such as a general hospital, most nurses will have developed a great insight and a great orientation to the patient as an individual. She has been with the patient when he was born; she has been there when he has died; she has consoled the relatives, and ministered to a wide variety of individuals and their problems. For those who have the ability and the desire, specialization at this time, has and can lead to a superbly qualified individual; one who can become a competent leader of a health team. Some of the areas of specialization are those of home care and discharge coordinator, intensive care unit nurse, and emergency room nurse. Certainly, with additional training, at this time, the individuals would make superb physician's assistants, far better, I believe than those being primarily trained in certain areas. They would particularly be helpful in the field of pediatrics, gynecology, obstetrics, and general practice. They could be used to great benefit in screening clinics.

Continuing Education

With our changing knowledge and changing methodism continuing education has become a must. Our previous methods of didactic presentations all too often have been unappealing, ineffectual, and unavailable to a great number of practicing physicians. Through the state medical associations and the impetus of the regional medical programs, there has been a great stimulus to making continuing education more pertinent by making it problem oriented and centering it around the community hospital staff. The use of television in this regard has been extremely disappointing, both from the standpoint of the media and the utilization of that media.

As the art of nursing has become more deeply rooted in science, the area of primary education has, of necessity, moved from the hospital to the educational institution. This, plus differences in utilization

of nurses from area to area, hospital to hospital, plus ever-changing techniques, has resulted in the development of the in-service training program. This is an essential feature in proper patient care for any hospital. Further consideration is being given to the development of such things as a community internship in certain nursing arts, and, as mentioned above, after a period of practicing, specialization.

Other professional and technical occupations are also moving into the field of continuing education. This has been given impetus by those groups which have had certifying boards. One of the great assets of a professional or technical organization is the leadership it can give to such a program.

Group Practice and Multiphasic Screening

Over the years, there has been an increasing tendency for doctors to join together in either loose or formal associations in order to provide the advantage of pooling equipment, knowledge, adequate coverage of practices, and the resultant decrease in overhead. Sometimes this has been in multi-specialty groups; other times as has happened to a great degree in San Diego, this has been among members of the same specialty. The government has published many, often inaccurate, figures showing the economic advantages of group practice. I think that there will be an increasing trend toward group practices of all types, as there are advantages to both the patient and the physician. However, I believe that many of these will continue to be loose associations, rather than formal and legally accepted groups. There is a great tendency toward placing doctors' offices with representation from many specialties in buildings close to hospitals so that a wide variety of facilities are readily available to the patient. The doctor and the patient have at hand consultation in many fields.

A new and recent development that offers a great advance is the multiphasic screening or health testing. This envisions the use of automated, multitest laboratories, data from self-taken history, additional data from the physician interview, and physical examination, all of which is computerized and its results provided in a convenient summary form for the physician at that time and as a record in the community for any physician to subsequently contact. Multiphasic screening from automated laboratory procedures has already resulted in a great increase in the diagnosing of hyperparathyroidism and aldosterine-producing adrenal tumors. Such programs reduce cost while greatly expanding the amount of information available; thus bringing many illnesses to diagnosis at an earlier time, when their correction or treatment is much less expensive.

I believe San Diego and California have made greater strides toward implementing the above programs than many other parts of the nation. Dr. Clifford Grobstein, the Dean of the University of California at San Diego Medical School recently made a strong plea for the development

of core curricula. We have here developed a coordinating council, composed of representatives from all levels of teaching of health manpower personnel, toward accomplishing this goal. The State of California has under consideration revision of its methods of licensure and certification of health professionals and technicians; a meditest center for the type of multiphasic screening I have mentioned is in the process of formation.

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American Medical Association
San Diego, California

WHERE DO WE GO FROM HERE?

The question is, "Where do we go from here?" I would like to rephrase that question, and ask, "Where must we go from here?" The statistics on the population explosion are well known in most educated circles, and some of the statistics related to the medical needs of our society are known. Some statistics are very old and some are inaccurate, though they do provide a bench mark to which we must pay attention. Those of us who have a professional and/or personal commitment must do all within our reach to put the means in motion to bring the health services into a more appropriate perspective and alignment with the needs.

In a medical field related to the topic of our conference, inhalation therapy, the statistics speak for themselves. For example, at this writing there are six registered inhalation therapists serving the need of the San Diego area, and 20 inhalation therapy major students in their second semester in the greater San Diego area, while a recent survey of the projected needs placed the positions open for inhalation therapists in June, 1971 at 51. This is a high cost allied health sciences education program. There are other high cost programs needed which do not presently exist. The bio-medical technology program underway at Grossmont College is another example of a high cost curriculum.

Cost is only one factor in the planning and implementation of new programs which may be identified as essential to the welfare of society at large. Some of these factors will be the subject of discussion during this conference, but should be explained in this writing to round out the purposes of this paper.

What problems or hurdles other than cost do the innovators of new programs face?

1. A very important step in this process is the identification of the need.
2. The communication necessary to establish that communities, regions, states, and even on the national basis, the user, the implementer, and the customer, are all in accord that the implementation must be done.
3. That an appropriate institution selection is made wherein the program may reside with respect to reasonably compete for the services and dollars essential to meeting its objectives.
4. Those responsible must provide program quality assurances in realistic terms, so that the graduate is confident, so that the customer and user may have confidence in the services rendered.
5. The clinical facilities holders in the area must be willing to share part of the program burden by providing essential field experience.
6. Public acceptance and good community relations are musts.
7. The recruitment of students who can succeed in the program may

not be easily done, where the rigors of theoretical foundations are challenging. Over-education and over-training can be penalizing to all.

8. Appropriate accreditation or certification of the institutions may present some problems. Long-range efforts should be made to change these if necessary.
9. The recruitment of qualified practitioners.

These steps, which constitute only a part of the package necessary for program implementation and realization, do as a composite offer a direction to go in the cause of implementing effective bio-medical technology education.

Beyond this, of course, there is a major item of initial financing. There is more cost in maintaining an acceptable level of education in that process as necessary to be current with the state of the art considering new breakthroughs and developments by the industry. This last point, current with the "state of the art" should be a flag to the researchers, designers, and marketing personnel in the industry, because of the new breakthroughs in electronic instrumentation. Such a breakthrough is happening at this moment with one new device that replaces the signal conditioner, amplifier, multiplexer, and analog digital data conversion, while giving more accurate data for the translator. It also eliminates the need for a regular power supply. This should give incentive for the development of new and more accurate sensing devices.

Another major direction to go, which hopefully will lead to the same end, is the re-education of persons who have been in the medical field as professional or semi-professional. Those who have not been in touch with the advance of technology for any reason should be upgraded and become informed. The bio-medical technologists, leaving the formal education field to perform their respective duties, must be of the caliber that will demand the confidence of the professionals and the semi-professionals with whom they work. They should experience the realization of the potentials in technology as it serves man. The bio-medical technologist's efforts should give the patients the benefits of many of the wonderful advances in technology.

It is recommended that a central effort be made by the institutions of medical service, education, and government to bring together the resources of all in a consortium to develop specific objectives in finding ways to serve the public better. This level of cooperation is not only desirable, it is essential to put efficiency into regional medical planning for health sciences education planning. Surveys, studies, experimental programs, and the integration of disciplines, or splitting of programs to obtain more appropriate balance and efficiency are the kinds of efforts which should be undertaken. The San Diego and Imperial Counties Health Sciences Education Council, serving as representatives from the forces of every significant health sciences education concern in the region, is an example.

The spirit of cooperation and work, and I underscore the word, work, is evidenced by the real progress being made in the articulation of health sciences education at every level in this region. Examples of maximum articulation which are now in the process of being brought about are:

1. The extending of college credit for appropriate catalog listings into the military medical programs where appropriate information course flows exist.
2. Utilization of regular college staff and the military instructors to teach in the service schools as an extension of the college.
3. The utilization of an existing campus computer for remote patient monitoring and/or medical measurement data analysis, as a team effort by the clinical facility and the education institution, is under study.
4. Another major concern which we should consider in our go, in "where do we go," is that of working for appropriate accrediting or licensing requirements, as they affect bio-medical technology.

Let's be realistic about the requirements.

C. Allen Paul, Dean
Technical Vocational Education
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MEETING OUR NATION'S MANPOWER NEEDS

First of all, I want to express my pleasure in being here with you. Secondly I want to assure you that the title of this presentation is a misnomer; just like almost everyone else, I have some ideas about meeting our nation's health manpower needs, but I assure you that I have no sure-fire panacea. Nevertheless, my recent acceptance of the challenging position as Director of the health manpower bureau has put me on the spot--or, perhaps more aptly stated, on the firing line. Sometimes in the past few months, I have seemed even to be in the cross-fire.

I am certain of one thing, however. If we are going into this business of meeting our nation's health needs, we need to examine what tools we need. Surely, the first of these tools is greater numbers of teachers, administrators, and supervisors. The education and training of every kind of health professional should be also expanded to prepare more qualified workers and more diverse kinds. However, together with expansion of educational opportunities, there must be modification and refinement of educational programs.

The Health Manpower Act of 1968 represents the most recent stage in the evolution of a public policy issue of profound significance to the United States. The Act reaffirms the national decision that health manpower resources are an essential component of a critical function--health services--and that the federal government shares responsibility for assuring the increased availability of these resources.

At the highest level of government, the President has stated that there is a health crisis and that he considers no one goal more important than to provide better health care for the American people.

From a base of bio-medical research, the national commitment to health programs involves disseminating and applying the results of that research, making provisions for state and regional health planning, and assisting health professions institutions and students in the training of health personnel to meet the expanding needs for health care.

Just under two years ago, the Department reorganized its health functions. Within the NIH, responsibility was retained for bio-medical research; in addition, federal support of education in the health professions and for bio-medical communications was added to the the NIH mission. The former Bureau of Health Manpower, after some reorganization, became the Bureau of Health Professions Education and Training. I must admit that the added words in our bureau's title make the whole thing too big a mouthful for me.

An important principle led the Department to bring together within NIH the three major functions of research, education, and communications: responsibility for the latter--communications--was assigned to the National Library of Medicine. This principle is that modern biological science and health professions education are so intimately interrelated

that their effective and efficient management requires that they be the responsibility of a single operational unit.

The ultimate purpose of all health activities is the prevention or cure of disease; if neither of these objectives is attainable, these efforts are oriented to the amelioration of the effects of the disease through extending the useful life of the patient and minimizing disability and suffering. Effective action requires, first of all, knowledge of the cause and usual course of disease, and, second, highly trained professional personnel to deliver the best care possible.

To deliver the best care technologically possible to all people in all parts of the nation is something easier said than done. The number of workers in the health professions has not kept pace with our growing population, advancing medical knowledge, and demand for high-quality professional services. Further, the population shows trends toward relative increases in the young, the aged, and those with chronic disabling diseases. These groups have special health care needs.

Moreover, new national programs such as Medicare, Medicaid, Comprehensive Health Planning, and the Regional Medical Programs are major factors in greatly increasing the demand for all categories of health personnel. Many thoughtful people are convinced that the delivery problem cannot be solved if we insist on keeping our present health care system exactly as it is.

I, for one, expect that we shall see significant changes in the health care delivery system during the next decade. We are all familiar, for example, with the extensive trend toward out-of-hospital care--as in ambulatory clinics, extended care facilities, and home-care programs. We are also familiar with the trend toward programs for training health personnel in new kinds of responsibilities. Nurses are receiving special training in pediatrics so that they can give primary care in areas where pediatricians are not readily available. Allied health workers of all kinds are being trained and employed in new ways that extend the time and skills of other health personnel whose educational programs are longer and costlier.

We hear a lot of talk these days about quality--quality of education, quality of health care, and quality of life. At this time of greatly increased demands on health services and an awakened social conscience seeking more equitable distributions of medical care, we are caught in a vise of serious manpower shortages and uncontrolled increases in costs. Nevertheless, we are committed not only to the traditional objectives of preventing, curing, and ameliorating disease; but also, to new goals of enhancing the quality of life for all people.

Possibilities come to mind for the future in terms of not simply preventing disease or death but of augmenting health. It is possible for example, that improved prenatal nutrition can elevate the intelligence level of an individual throughout life. New knowledge of family pl[illegible]ng,

controlling the environment, and normal growth and development, particularly with respect to the aging process, will undoubtedly stimulate the health professions in seeking to amplify the quality of life.

Disraeli has often been quoted as saying that the health of the people is the foundation upon which their happiness and their powers as a state depend. Further advances in the health of our nation depend significantly on the development of bio-medical knowledge and the education of health personnel. Optimal health and a high quality of life, for every citizen, have become the bold objectives of public and private institutions with a wide variety of missions.

The need for manpower in all health occupations is impressive. In 1967, an estimated 3.4 million persons were employed in the allied health occupations; in 1980, it is expected that there will be 5 million health workers.

Within these figures, about 650,000 were employed in the allied health occupations in 1967. One million persons in the allied health field are projected for 1980.

As we grapple with the monumental task of preparing sufficient numbers of well-qualified health personnel, we recognize increasingly the dependence of the health care system upon these professional, technical and supportive allied health workers who extend the scarce resources of practitioners and administrators in the fields of medicine and dentistry. In fact, a corps of allied health personnel offers the greatest potential to expand and improve the quality of the full array of personal and environmental health services that are essential to the maintenance of health, the prevention of illness, and treatment of disease.

The full benefits to be gained from provision of services for which allied health personnel are particularly capable can be realized, however, only if there is an adequate support for educational resources that will attract able students and prepare them for meaningful health careers. Within the contract of the self-evident need for more allied health workers, I would like to examine our several roles in the support of this enterprise.

Funding for these educational resources will continue to be a primarily state and local responsibility. Available federal dollars are not expected to be sufficient, even on a matching basis, to narrow the gap between the supply and need of other health professionals whose training is longer and costlier; therefore local dollars will have to foot the major part of the bill for allied health training.

However, as you know, students in the allied health fields have received aid under the Vocational Education Act and the Manpower Development and Training Act, administered by the Office of Education and the Department of Labor, Regional Medical Programs, and other special mission-oriented health programs also have contributed significantly to the allied health training effort.

The Allied Health Professions Personnel Training Act of 1966 was the first federal legislation specifically designed to increase the number of allied health personnel and to improve and expand allied health education and training. Four types of assistance were authorized by the Act--construction of teaching facilities; improvement and strengthening of educational programs; preparation of teachers, administrators, supervisors and development of new methods and curricula for new kinds of health technologists and technicians. Limited funds available for the implementation of the Act were factors in the decision to give initial priority to those allied health occupations most directly related to patient care and to those for which shortages were most fully documented.

One of the most important objectives of all the educational programs administered by the health manpower bureau has been the advocacy of the health-team approach not only to health and medical services, but also to the setting for the education of all health personnel. I am delighted to see this concept being fostered by this conference.

The development of health manpower education centers will produce many benefits. Education and training will be carried out in the most effective and efficient period of time, in settings most appropriate and relevant to the level of skill and judgment required by the job or professions. A flexibility will be provided that will be responsive to changing and evolving requirements for the delivery of health services. Innovation will be encouraging in the organization of educational and training programs. Students will be more able to adapt to changes as they take place in the occupations for which they were originally prepared.

One of the most important benefits from health manpower educational centers, however, will be the recognition by each health discipline of the contributions of all the others; this awareness will be instilled from the first day of training and will be enhanced through continuing contact and cooperation. I want to be very explicit that I think these centers should encompass the education of medical students, interns, and residents as well as nurses, dentists, and the whole array of allied health personnel.

One of the most important needs of these centers will be faculty, specially trained in the accelerating developments that exist in all aspects of preparing health manpower that, in turn, will provide health services that will reflect increasingly revolutionary changes in the concepts of health maintenance and protection. Preparation of such faculty has the highest priority of the health manpower bureau; and it is my hope that it will be yours.

We must stimulate innovative thinking necessary to update training; we must encourage health personnel to think of themselves as team members, each an important link in the care of patients in the prevention of disease.

Through these developmental projects in educational settings, we can support curricular modifications to meet the special needs of students with backgrounds of socio-economic disadvantage or students with previous

health training such as returning medical corpsmen. We can also promote curricular development for training in new health services that result from evolving technology or realignment of duties among the health disciplines.

Interrelationships and cooperative planning among educational institutions and health-service programs must be actively sought and strengthened. Through these linkages we can strive to improve the skills and judgment of all health personnel. We can also provide for vertical and horizontal mobility of these workers. Continuing opportunity is an essential component of high motivation and dedication to a health career.

Experimentation and demonstration in education and training of allied health personnel must be pursued energetically, but with a high degree of professionalism. Irrational, unscientific, and unsophisticated attempts to introduce training programs for new types of health personnel must be diligently discouraged by educators, health manpower planners, and all others who have responsibilities for the education, training, and utilization of health workers. Proliferation of occupational categories without sound reasoning would only feed the flames of chaos already fanned by years of neglect during which jobs, job descriptions, and training have been created to meet immediate, local needs without considering the feasibility of replication in other settings.

The demands to increase the supply of qualified health manpower in the decade ahead will require cooperation of the highest order among the various groups and institutions interested in the training and increasing effectiveness of health personnel. The time has come for an interface among all interests in the health sector of our society. It must be candid. It must be professional and without pettiness. It must be motivated by an honest desire and intention to take action that will result in dynamic, yet orderly progress toward meeting the nation's health manpower needs.

This conference represents such an effort. I compliment Grossmont College leaders and the American Association of Junior Colleges for reaching out and seeking involvement of the Regional Medical Program, the University of California, San Diego School of Medicine, and the local chapter of the Institute of Electrical and Electronic Engineers in this conference.

Kenneth M. Endicott, Director
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National Institutes of Health

MILITARY EXPERIENCE DIRECTED INTO HEALTH CAREERS

The Navy's role in allied health technology and it's approach to get better community health care. What's happening? Melvin Laird, Assistant Secretary of Defense (Manpower and Reserve Affairs) wrote the following memorandum:

> It is my understanding that some 30 to 35 thousand enlisted personnel are released from active duty each year who are qualified medical technicians or technologists (allied health personnel) and that apparently very few of these highly trained men and women find their way into civilian jobs in the health field.
>
> It is also my understanding that this waste of valuable human resources results partially from our inability to identify the persons in question in advance of the separation or to determine where they will be separated. Among other factors that may contribute to this result are the job structure in the civilian health professions, lack of knowledge of the existence of this pool of trained personnel on the part of potential civilian employers.
>
> Removing whatever obstacles exist to the utilization in civilian health professions of the medical skills acquired in service would further one of the human goals of the Department of Defense. Accordingly, I request that you develop a comprehensive plan to maximize the opportunities for personnel with appropriate skills and training in military life to enter careers in the civilian health professions and advise me of the additional resources needed to implement it.

What do we do? We see from Mr. Laird's memorandum that the transition from military occupation in health care areas to similar positions in the private community hasn't been taking place. In answering the question, "Why does this happen?" among other things, we would reply:

1. Starting salaries and salary spread is not adequate.
2. Too rigid licensure requirements preclude or frustrate an aspiring candidate.
3. Military training and experience is not even recognized or equated by all accredited schools of health care vocations. In this response, Captain John H. Bing, Medical Service Corps, U.S. Navy summed it up last year here at Grossmont. "And it is simply a fact of life in these United States that military training and experience do not always count for much when veterans look for employment in civilian allied health fields."
4. There is not application by some educational institutions of a "calculated risk" to help retain a potential health

care technician or technologists. For example, tunnel vision on technical specialties and no latitude in other areas, the "three R" tradition, rigid entrance requirements, soft peddling past training and experience.

I do not intend to relate all of the problems the veteran has in seeking employment. Among us are those veterans who have surmounted those problems and have succeeded in the professional, educational and health care fields. However, I would like to tell you about what the Navy does at the Naval Hospital in Balboa Park and what we can do.

In order to fully comprehend the roll of the hospital corpsman in the naval service it is necessary to recognize their accomplishment through the years. From the very beginning of the Navy it was found necessary to make provisions for the care of the sick and injured. An act of Congress, 1799, provided: "A convenient place shall be set apart for the sick and hurt men, to which they are to be removed, and some of the crew shall be appointed to attend them." That portion of the ship assigned for care of the sick was designated as the cockpit. It was usually located in the forward part of the vessel, below the water line, as a protection from shot and shell. The cockpit was also referred to as the "sick berth" and in later years it became known as the "sickbay," as the rounded shape of the recess or bay was located in the forward part of the ship between decks.

It wasn't until one hundred years later in 1898 that the hospital corps came into existence as an organized unit of the Medical Department under the provisions of an act of Congress, approved 17 June 1898. Eighteen years later, on 29 August 1916, the hospital corps was reorganized by another act of Congress which provided three and one-half percentum of Navy enlisted strength to be hospital corpsmen.

During World War I, the reputation of the hospital corps for performance of duty, especially in the field with the Marine Corps, was greatly enhanced. Many of the members were cited for valor and performance of duty under fire, by both the United States and France. The Honorable James Forrestal, Secretary of the Navy during World War II, and later the first Secretary of Defense, paid honor to the hospital corps for its singular attainments during that conflict.

Military medicine was thought of as being different from civilian medicine in the use of its hospital corpsmen. The Navy's corpsmen were trained and used by the Navy due to the shortage of physicians. These corpsmen were assigned to small ships and stations in remote areas isolated from the sophistication of medicine we appreciate here in San Diego. They administered to the sick and wounded within their capabilities independent of a physician. Now, due to the present and predicted shortages of allied health care technicians in the private sector, this difference is erased. For example, MEDEX, one of the new health professionals often categorized as "physician's assistants" is a private sector's copy of the Navy's independent duty corpsman.

We have, at the Naval Hospital in San Diego, eight formal schools in session ranging from sixteen to sixty weeks. (For details please see Appendix I.) The number of students enrolled in these classes range from eight to eighty.

Because of the shortage of health care personnel in San Diego, many of the staff of our hospital "moonlight" in the health care facilities of this community. Now that we know what's happening, what do we do now? We can program military experience directed into health careers. By this program we help men and women trained in medical skills in the service make use of the skills in allied health programs, training opportunities and employment.

In recognition of the present shortage of all levels of health care personnel and the anticipated increase of some 1,600 added acute beds in the San Diego area by 1972 (see Appendix II) which require over 3,000 additional health care personnel, the Navy, Grossmont College and other San Diego community colleges have been considering innovative methods for providing veterans and servicemen academic credit for their military training and experience, and determining where lateral and vertical placement can be made for the student whose formal education was interrupted.

Grossmont College and other San Diego colleges are presently reviewing a credit challenge given by the Navy formal schools at the Naval Hospital, San Diego and are determining what course components are equal with those in their respective current catalogs in order that advanced placement or unit credit can be given for work accomplished.

Where the Navy had specified programs that are in line with the college catalog, Grossmont is arranging to secure certification for Navy instructors, as unpaid staff, so the student in the Navy school could earn credit while in the military service school. Furthermore, the possibility of Grossmont College instructors teaching at the Naval Hospital, San Diego is another avenue being explored.

APPENDIX I

HOSPITAL CORPSMAN

TECHNICAL SPECIALTIES

IN

NAVY SCHOOLS	CIVILIAN EQUIVALENT
1. Basic Hospital Corps School "A" School--Attended by all personnel upon being assigned to the Hospital Corps Hours of Study--640 14 weeks in Course	Practical Nurse; then after 34 months, may take the LVN examination; Emergency Medical technician

ADVANCED

TECHNICAL SPECIALTIES

1. Cardiopulmonary Class "C" School Hours of Study--2039 52 Week Course	Cardiopulmonary Technician; LVN
2. Clinical Laboratory Class "C" School Hours of Study--2625 60 Week Course	Laboratory Technician LVN
3. X-Ray Technician Class "C" School Hours of Study--2080 52 Week Course	X-Ray Technician; LVN
4. EKG and BMR Technician Class "C" School Hours of Study--640 16 Week Course	Clinical Corpsman; Biomedical Body Measurement Technician; LVN
5. EEG Technician Class "C" School Hours of Study--640 16 Week Course	Clinical Corpsman; Biomedical Body Measurement Technician: LVN
6. Operating Room Technician Class "C" School Hours of Study--1040 26 Week Course	Operating Room Technician; LVN

7.	EENT Technician Class "C" School Hours of Study--1040 26 Week Course	Opthalmic Assistant Technician; LVN
8.	Urological Technician Class "C" School Hours of Study--1040 26 Week Course	Clinical Corpsman; LVN

All the advanced technician specialties listed above are offered at this command, Naval Hospital, San Diego, California.

APPENDIX II

UTILIZATION OF CORPSMEN

The San Diego Veterans Hospital is currently under construction adjacent to the School of Medicine, U.S.C.D., with a completion date of late 1971. This hospital will require over 1500 personnel for staffing. The health manpower requirement for this hospital will be filled by several sources. Many personnel, however, will be recruited locally in competition with other hospitals. This recruitment will coincide with other large demands for health manpower due to expansions of acute hospitals in San Diego County. The total projected acute beds for the period of 1971-72 are as follows:

Facility	Added Acute Beds - 1972
VETERANS HOSPITAL	811
ALVARADO	170
COLLEGE PARK	32
AT THE TERRACE	130
PARADISE VALLEY	74
EL CAJON	53
ENCINATAS	50
TRI-CITY	64
CLAIRMONT	60
HILLSIDE	16
KAISER - LA MESA	50
BAY GENERAL	102
Total Additional Projected Beds:	1612

Nursing homes and extended care facilities additions and new construction will add further manpower requirements.

HOSPITAL RECRUIT (HR) -Hospital recruits are new enlistees in the Hospital Corps. Upon completion of recruit training, their rate is changed to hospital apprentice and they are assigned duty under instruction at a class A Hospital Corps School.

HOSPITAL APPRENTICE (HA) - After graduation from Hospital Corps School, hospital apprentices shall be assigned duties directly related to patient care at naval hospitals, station hospitals, larger shore activities, or large ships. They should be assigned to wards for duty and on-the-job training in elementary nursing procedures.

HOSPITALMAN (HM) -Hospitalmen should be assigned to wards or other clinical services for duty and on-the-job training in the more advanced nursing procedures, or for duty and on-the-job training in elementary clinic procedures.

HOSPITAL CORPSMAN, THIRD CLASS (HM3) -Hospital corpsmen, third class, are normally assigned to wards, clinical services, or administrative units; for duty as senior ward corpsman; for duty and on-the-job training in the more advanced clinic procedures; or for duty and on-the-job training in elementary administrative procedures.

HOSPITAL CORPSMAN, SECOND CLASS (HM2) -Hospital corpsmen, second class, are normally assigned duty as senior ward corpsmen, or duty in clinics or administrative units and further on-the-job training.

HOSPITAL CORPSMAN, FIRST CLASS (HM1) - Hospital corpsmen, first class, are normally assigned supervisory duty on wards, or assistants to the chief of a clinical service, or as petty officer in charge of an administrative unit.

CHIEF HOSPITAL CORPSMAN (HMC) -Chief hospital corpsmen are normally assigned supervisory duties as senior assistants to the chief of a clinical service, or as chief petty officers in charge of an administrative section, or as the assistants to the chief of an administrative division.

SENIOR CHIEF HOSPITAL CORPSMAN (HMCS) -Senior chief hospital corpsmen are normally assigned duties as senior assistants to a chief of service or division or as senior petty officers in charge of an administrative branch.

MASTER CHIEF HOSPITAL CORPSMAN (HMCM) -Master chief hospital corpsmen are normally assigned in billets requiring qualifications at the highest enlisted level in duties requiring top leadership, supervisory and training skill, and professional qualifications.

Training Requirements for HM Ratings

BASIC HOSPITAL CORPS SCHOOLS, CLASS A - The mission of the basic Hospital Corps schools, class A, is to instruct and train enlisted personnel in the basic subjects and procedures required to qualify them for duties as general service hospital corpsmen. The curriculum is designed to prepare enlisted personnel to perform the general duties normally required of hospital corpsmen in the first four years of their naval service. The curriculum emphasizes direct patient care. This school, together with inservice training, prepares hospital corpsmen for advancement in rating through hospital corpsmen, third class. It is mandatory for all personnel upon first entering the Hospital Corps, except that waiver of this requirement may be requested from the Bureau of Medicine and Surgery for individuals considered qualified as a result of civilian training. Certificates of graduation from basic Hospital Corps are issued to graduates, but graduates are not assigned an NEC.

ADVANCED HOSPITAL CORPS SCHOOL, CLASS B - The mission of the advanced Hospital Corps school, class B, is to give advanced training to petty officers of the Hospital Corps to prepare them for duty as senior general service hospital corpsmen and for duty independent of a medical officer. The curriculum emphasizes first aid, tentative diagnosis and emergency treatment of disease and injury, personal hygiene and environmental

sanitation, and medical department administration. Students are normally enrolled in this school at the time of sea/shore or shore/sea rotation. The maximum possible number of career hospital corpsmen are trained in this school prior to assignment to independent duty. Certificates of graduation from advanced Hospital Corps schools are issued and graduates are assigned to NEC HM-8405.

TECHNICAL TRAINING COURSES, CLASS C - The purpose of technicians courses is to train selected hospital corpsmen at the appropriate time in their naval careers to perform duties as technical assistants in specialized fields including diagnostic procedures, specialized treatment, preventive medicine, submarine medicine, medical research, and medical department administration. Courses are 16 to 60 weeks in duration and are continuously under review to meet changing medical department requirements. Students are selected by the Bureau of Medicine and Surgery on a competitive basis from among qualified volunteers. Normally, hospital corpsmen are not selected for training in more than one technical specialty; however waivers of this factor may be requested. Normally candidates for advanced Hospital Corps school, class B, and for medical administration technician training are selected without regard for Navy Enlisted Classifications previously assigned. The course in medical field technology is mandatory at the time of first assignment to duty with the Fleet Marine Force. Requests for other technician training are desired from hospital corpsmen serving ashore or afloat. To the extent feasible, selected candidates are ordered to duty under instruction as technicians at the time of sea/shore or shore/sea rotation. The "Manual of Navy Enlisted Classifications," NAVPERS 15105 (series), lists the broad duties of technicians and code numbers assigned to each.

INSERVICE TRAINING - The purpose of inservice training is to provide a continuing, organized training program at each duty station to supplement the formal training received in Hospital Corps schools. This program is designed to broaden knowledge and skills, to keep hospital corpsmen abreast of the rapid advances in medical procedures, to provide well-trained hospital corpsmen for duty in their rate, and to qualify them for advancement in rating. Instruction is continuous and progressive and covers subjects outlined in the appropriate training courses for advancement in rating. On-the-job training in the duties of general service hospital corpsmen is an integral part of the inservice training program. Instructors are officers of the medical department or petty officers instructing under their supervision.

ON THE JOB TRAINING OF TECHNICIANS - On-the-job training of technicians is necessary to supplement the number graduated from schools and courses in order to meet local and total requirements. Naval hospitals and other naval medical facilities shall conduct on-the-job training of technicians to the extent feasible. Technicians so trained shall be reported to the Bureau of Medicine and Surgery. Certificates of On-the-Job Training will be forwarded with the letter authorizing the appropriate NEC.

OUTSERVICE TRAINING - The bureau encourages Medical Department Personnel to take advantage of part-time outservice training in accredited civilian institutions and will authorize tuition aid, provided funds are available, for courses directly related to areas of Medical Department responsibility. Such areas are considered to be the physical, chemical, clinical, biological

and sociopsychology sciences and the fields of Medical Department Administration.

Consideration will also be given to requests for courses outside those areas if they can be shown to be a necessary part (required credits or prerequisites to desired courses) of a fully planned program leading to a degree or certificate which will enable the applicant to assume increased responsibility or to function more effectively toward accomplishing the mission of the Medical Department.

William E. Arns
Commander, Medical Service Corps
United States Navy

TECHNICAL SERVICES:

A FORM OF PARAMEDICAL MANAGEMENT

In this day and age, the paramedical specialist is arising out of areas that were once only in the realm of the physician. These specialties have been given responsibilities that only five years ago would have made nurses shudder. This increase in responsibilities has manifested itself in higher salaries and greater administrative costs.

The basic paramedical groups have splintered to form sub groups. These splinter groups have in time made themselves valuable in both a diagnostic sense and in the medico-legal aspect of medicine. The small and medium sized hospitals realize that they have a need for these special services, however it is usually beyond their economic capability. Being a medium sized hospital of 200 beds, we, as are many hospitals, are faced with the same situation. In order to help alleviate this problem, a system of paramedical administration and service extension was devised and is slowly being integrated into the management of Doctors Hospital.

The plan devised required a base that is strong yet flexible. This base may spring from several paramedical specialties. The one utilized by Doctors Hospital was that of the trained cardio-pulmonary technologist. This broad based paramedical specialty combines training in inhalation therapy, electrocardiography, monitoring techniques, blood gas analysis, pulmonary function testing, basic medical electronics, cardio-vascular study techniques, and basic surgical and aseptic techniques. The only other base considered adequate for this type of paramedical division was the experienced inhalation therapist. If the inhalation therapist is utilized, the applicant must have experience in the field of bio-medical electronic data acquisition, i.e. electrocardiography. Once this base is established, the hospital may take the first step in the establishment of a technical service division.

The specialties that are to be under the technical services division are those of inhalation therapy, electrocardiography, pulmonary function testing, physiological monitoring, and blood gas analysis. The areas of electromyography, electroencephalography and ultra sound diagnostic procedures are to be added after study by the administrator for professional services, the chief technologist, technical services division, and approved by the hospital's administrator.

Each of the aforementioned specialties usually comprise a department within the hospital's management structure. In this mode, these departments require a chief technician and staff technicians to carry out the physician's orders as they relate to the department involved. It is my feeling that this type of administrative structure is costly and cumbersome to operate. The proper coordination of several departments that are treating and testing the same organ systems is difficult at best and usually tends to become bogged down in red tape.

Acting on this premise the following administrative structure was submitted for approval:

Hospital Administrator

Administrator for
Professional Services

Chief Technologist
Technical Services Division

Senior Technologist
Technical Services Division

Inhalation Therapy Supervisor	EKG Supervisor	Special Studies Supervisor
Staff Technicians	Staff Technicians	Staff Technicians
Trainee	Trainee	Trainee

By utilizing this type of management structure several advantages to the hospital can be seen. First, the number of administrative personnel within the division is cut from five to two. The supervisors are "working supervisors" and are senior technicians. They play no direct role in the administrative aspect of the hospital/department relationship. Second, the personnel doing these procedures are trained in bio-medical data acquisition, thereby yielding a constant quality procedure. In many institutions, basic procedures such as electrocardiograms and simple spirograms are recorded by members of central supply or the clinical laboratory. Although these personnel are well trained in their specialty, bio-medical procedure recording rarely lies within their specialty training. This situation often creates a higher cost through poor equipment care and repair, repeating procedures because of technical inadequacy, and the possibility of high material cost through inadequate training of the personnel involved.

The cost to the hospital in the form of salaries and employee benefits can be reduced without a loss in the quality or quantity of service. This is in part accomplished through proper staffing criteria. The criteria for staffing the division was devised with the help of the Commission for Administrative Services in Hospitals (CASH). These established criteria are updated on a semi-annual basis. The employee need is evaluated as required with the help of CASH's monthly Labor Performance Control Reports. With these reports, an employee/service analysis is possible at any time. Employee/service control lends itself to a greater efficiency in the use of the institution's income.

The second, and possibly the most important, factor in the division's cost is the implementation of the "multi-purpose" technician. This technician is taken from the professions of inhalation therapy, electrocardiography, licensed vocational (practical) nursing, and bio-medical electronics technician. These personnel are subjected to an

intensive formal inservice training program lasting one year or more. During this time, the technician is taught the procedures and treatments offered by the division. At the end of the training period, the technician can function with competency in any of the unit sections.

The use of the "multi-purpose" technician lends itself to the reduction of employee costs. Under normal circumstances, 1.43 people are required to cover 420 minutes of procedure time. If the divisions were staffed separately with their own administrative structure, the number of personnel required would be approximately eight. This personnel requirement requires a salary commitment of approximately $4450 per month or $52,250 per year. If however, these divisions were brought under a technical/administrative head with the "multi-purpose" technicians utilized, the personnel requirements drop to appoximately 5.50 to 6.0 for the same criteria. The salary and benefit commitment is now only approximately $3,600 per month or $43,250 per year or a savings annually of 17 per cent. Other savings that can be realized are seen in the duplication of request/charge slips and procedure reports, the cost is approximately $3.31/division/200 requests or procedures. If the technical services division form of management is utilized, all procedures and charges within the division can be placed on one slip at a cost of about $3.25/200 requests or procedures. This is a savings of about 67 per cent/200 requests or procedures. The procedure reports can be standardized allowing one form for division use instead of three, yielding a 30 per cent reduction in cost over the old method.

In summary, the outlined management structure combined with the implementation of the "multi-purpose" technician can bring many procedures into institutions that might not have been possible before. If the technical base is well formed and the inservice training of a high quality, then most hospitals may be able to reduce cost and increase service through the use of a technical services division.

Until recently, there has been no personnel available with training in physiological monitoring and electronics. To fill our need of "multi-purpose" technicians, a course of instruction was suggested, written, presented to the administration, and upon approval, placed into practice. The course is comprised of 225 hours of theory interwoven into 18 months of on-the-job training.

Personnel taken into this course of instruction were required to have a high school or higher education. The necessity for previous hospital experience was not required.

The training program is divided into three stages. The first stage is three months in length. During this time, the trainee is presented with an overall view of the unit and its function within the hospital's administrative structure as well as its position within the realm of total patient care. The trainee is also versed in the basics of inhalation therapy and electrocardiography. At the end of this period the trainee is evaluated and either advanced or allowed to resign from the course of training.

The second stage of training refines the knowledge gained in the first stage and allows for advancement in the two basic fields.

The third and final stage is probably the most important. In this phase, the trainee learns the specialties of blood and expired gas analysis, technical electrocardiography, physiological monitoring and interpretation, pulmonary function testing, electromyography, etc. We hope through careful selection that all personnel will progress to this phase.

Finally, I am of the opinion that this type of training, regardless of the field, serves two basic purposes. The first of these is the "multi-purpose" technician. As I explained earlier this alone can save the hospital money in the form of salaries with consistently high quality services.

The second and possibly the most important advantage of this type of training is its effect on the personnel themselves. The technician who completes this course of instruction has gained proficiency in at least three paramedical fields. This allows the technician to be somewhat selective if he should leave our hospital. This technician may, if he so desires, specialize in one field at another date. This technician gains a greater amount of latitude in patient care. In providing this latitude, we feel that the technician will not fall into a state of boredom and will gain a feeling of job acceptance and job security.

The single purpose technician can be placed in a position of boredom and his ingenuity can be stifled. This can reduce his ability to move within the areas of paramedical technical practice. If I, as a technologist, and you, as educators, give this person a multi-purpose training program he will not only assure himself of a future within several fields, but we can give the hospital and physician a person who is capable of serving in a multitude of capacities.

The education of these personnel whether it be in the hospital, junior college or in a baccalaureate program is of prime importance. We must always keep one thing in mind, the hospital industry needs personnel that have a good education that is broadly based and yields a person that can function with a great deal of latitude within the broad program of patient care.

Webster T. Russell
Chief Technologist
Doctors Hospital
San Diego, California

REVIEW AND PREVIEW

In retrospect, the Conference proved that knowledgeable men are urgently seeking ways to improve training of manpower for the technological jobs in health care already in short supply. This meeting decided to limit its agenda but to expedite action in several areas especially applicable to community colleges. On the broad front the Conference members urged more cooperation among educators, government agencies, industry, and the medical professions on a continuing basis if we intend to take efficient steps toward an improved medical health care system in this country.

Item: A strongly innovative Educational Consortium has been proposed which would band informally but closely the University of California at San Diego and its School of Medicine, with the San Diego State College and Community Colleges of the Greater San Diego area. This consortium already has launched positive steps to encourage improved courses and programs toward training of technicians by area junior colleges; to develop and improve methods and studies for graduating health science teachers for community colleges; and to devise and develop graduate studies and university-level programs for health science specialists. This program features active projects rather than theoretical studies and recommendations.

Item: An exchange program emphasizing informal correspondence between community colleges in many parts of the country has been started between Willard Dellegar, Head, Bio-Medical Engineering Program, Grossmont College, El Cajon, and individuals elsewhere interested in developing bio-medical electronics and other related programs. Approximately 100 community colleges have expressed interest informally.

Item: A lively student recruitment program is proceeding in the San Diego County area, much of it under the Women's Auxiliary of the San Diego County Medical Society. Mrs. Mack J. Harris has additional information about work presently reaching more than 70 junior/senior area high schools. Mr. W. Dellegar also is originating a collaborative program.

Item: A direct result of the conference was an invitation to Conference Manager C.M. Hatcher to speak to the Board of Directors of the American Medical Technologist organization in Chicago concerning methods for improving cooperation between professional associations, schools, hospitals, and service organizations. AMT has pledged full cooperation in devising and supporting mutually helpful studies, job description programs, equivalency ratings for work experience and degree courses, and among institutions responsible for accreditation and certification.

Item: An imaginative and highly innovative program has been launched to coordinate community college training of technicians with U.S. Navy schooling of its technicians in the San Diego area. Grossmont College, with other area community colleges, is presently exploring methods to exchange instructors, share naval hospital facilities, and in effect, develop dual "campus" MEDCOMP programs for degree programs similar to earlier Navy "ADCOMP" executed at Grossmont College for the Navy.

Item: Some valuable equipment may be acquired on a 100 per cent discount basis for use by Grossmont College if tentative arrangements now under discussion develop further between the school and a manufacturer of a simulated, electronically equipped "human torso" device.

Looking ahead, there would appear to be a demonstrated need for continuing conferences of the sort developed in 1969 and 1970 at Grossmont College. The meetings are innovative and have brought out vigorous exchanges of data and knowhow. A number of new or at least fresh techniques have been applied to the discussions, and the information developed from these sometimes controversial critiques have in several cases been put into action.

A year is too long in our critical health care situation to allow between discussion of problems and review of the action thereby generated. Perhaps two or three such Grossmont College Conference-type meetings could be arranged, possibly one in the South and one in the East--to augment a spring conference in San Diego.

On the other hand, perhaps the interest in continuing such conferences is not strong enough. What do you think about these communications? Should we hold another such conference? What could be done to improve the meeting? What subjects would you like to see included on the agenda?

Write your thoughts to: Mr. Willard Dellegar, c/o Grossmont College, 8800 Grossmont College Blvd., El Cajon, California or to C.M. Hatcher, 4454 Osprey St., San Diego, California 92107.

Charles M. Hatcher